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DOWN THE GRAND CANYON

BY LEWIS R. FREEMAN

DOWN THE COLUMBIA

DOWN THE YELLOWSTONE

THE COLORADO RIVER

SENTINEL ROCK AT MOUTH OF WA-WEAP, GLEN CANYON

DOWN THE GRAND CANYON

BY

LEWIS R. FREEMAN

Author of: "The Colorado River," "Down The Yellowstone," "Down The Columbia," etc.

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To

COL. CLAUDE H. BIRDSEYE

CHIEF OF THE U. S. GEOLOGICAL SURVEY
GRAND CANYON EXPEDITION
OF 1923

TO WHOSE COURAGEOUS AND CAPABLE
LEADERSHIP ITS SUCCESS
WAS SO LARGELY DUE

The author wishes to thank the Editors of *Sunset* and the *National Geographic Magazine* for permission to reprint portions of articles which originally appeared in those magazines.

FOREWORD TO SECOND EDITION

At the beginning of 1930 one gets a clearer historical perspective of the United States Geological Survey Grand Canyon expedition of 1923 than was possible at the time I wrote the original account of its work.

The so-called miraculous escape of the party from a cloudburst-flood rushing down the Colorado resulted in an equally devastating deluge of newspaper publicity that quite submerged for a time the expedition's real purpose and accomplishment. When the flood of near obituaries subsided the tangible achievement began to show, and today this can be seen and appreciated for what it is worth.

Lacking the dramatic spectacularity of the Powell expedition of 1869, unmarked by the stark tragedy which stalked the Brown-Stanton railroad survey of twenty years later, and unaccompanied by the interminable series of mishaps and hair-breadth escapes punctuating the more or less apochryphal yarns of subsequent adventurers who voyaged the great gorge to trap, prospect or for what personal profit they could reap, the Geological Survey expedition still contributed more to the accurate scientific knowledge of the Grand Canyon of the Colorado than accrued to the credit of all the others combined. The almost fantastic exaggerations of the heights of rapids which characterized Powell's narrative and which had been perpetuated by many who followed, were reduced to simple sets of figures recording falls in given

distances. Geology, hydrography and topography were handled scientifically and unemotionally. The result was a fund of authentic information that superseded for all time the mass of half-guessed surveys, traditions, exaggerations and falsehoods that had previously made up the sum total of so-called Grand Canyon knowledge.

Credit for this notable achievement was due, primarily, to the year or more of research and preparation carried on in Washington under Director George Otis Smith and principally by Hermann Stabler, Chief of the Land Classification Branch of the Survey; to the courage, initiative and resource of Colonel Claude H. Birdseye, Chief of Party; and to the individual work during and subsequent to the voyage of Dr. Raymond C. Moore, Geologist, E. C. La Rue, Hydrographer and R. W. Burchard, Topographer. The zeal and resourcefulness of Roger Birdseye in getting supplies to the expedition by (in some instances) long-disused canyon trails was another important factor in its success.

Handling the boats and running the rapids, the thing which bulked biggest in the popular eye, was merely good robust rough water work. Equipped with life-preservers as we were, and with every practicable provision made for picking up anything floating after an upset, boating risk could not have been much greater than that of threading the traffic of New York or Los Angeles. I have always held with the level-headed voyageur Julius F. Stone that boating disaster in the Grand Canyon was due nine times out of ten to either the incompetency or care-

lessness of the boatman. My own derelictions in this line have been pilloried for posterity through the placing of my patched and battered Grand Canyon boat on permanent exhibition in the Smithsonian Institute at Washington.

Much has happened in and about the Grand Canyon since it was traversed by the expedition of 1923. A hasty survey which we made the day of the start from Lee Ferry has been translated into soaring steel and concrete, and one of the highest bridges in the world spanning the head of the great gorge below the Paria makes it possible to drive a car from El Tovar to Bright Angel Point, on the North Rim, in a single day.

The Boulder Canyon Dam Bill became a law in 1928, and it will now be but the matter of a few years before rapids of the lower canyon through which we guided our boats among foam-masked rocks, will be cruised over by sight-seeing motorboats, while the harnessed river, the claws of its flood-menace forever drawn, will supply power and water for a large part of the Southwest.

But the greatest present-day progress in the Grand Canyon region has been in the provision of facilities making this most impressive of our scenic areas readily available to the tourist. Ten years ago a visit to the Grand Canyon meant only the rail journey to El Tovar, on the South Rim, with perhaps a horseback trip down the Bright Angel Trail to the river.

El Tovar is still the easiest point at which to reach the Grand Canyon, but today a series of connecting

motor bus tours over the fine roads in and beyond the National Park make it possible to visit both the North Rim and the South Rim of the gorge at points hundreds of miles apart. The Santa Fe-Harveycar services, plying from the Grand Canyon to and across the great Navajo Indian Reservation, reach as widely separated scenic wonderlands as the Rainbow Natural Bridge in Utah, the Indian pueblos and Carlsbad Cavern of New Mexico, the Mesa Verde National Park in Colorado and the Painted Desert and the Petrified Forests of Arizona.

It requires no great stretch of the imagination, indeed, to picture canoes and outboard motor-driven skiffs operating in tourist services up and down the hundred and fifty miles of gorge above Lee Ferry known as Glen Canyon. As striking scenically as the Grand Canyon and simpler and safer to boat than scores of streams now used by thousands of canoeists in our northern states and Canada, this would make one of the most delightful and novel voyages in the world.

Equally striking has been the development in opening up beautiful Zion and Bryce National Parks, the Kaibab National Forest and that section of the Grand Canyon National Park lying north of the Colorado. Much of it barely explored until recently, and with vast areas only reachable by pack-train, the construction of a splendid system of modern roads by the State of Utah and the National Park Service, and the building of camps and lodges and the establishing of motor transportation services by the Union Pacific Railway, has made this incomparable world

of cliffs and color only less accessible than the South Rim. The expenditure for lodge, cabins and water system at the North Rim alone has amounted to over a million dollars, and to nearly half of that sum at Bryce and Zion.

The opening of the Zion-Mount Carmel cut-off in the spring of 1930 signalizes the completion of the greatest feat of highway building ever known. With its mile and a quarter of galleried tunnel through solid rock, this is not only the most audacious piece of road building in engineering history, but also the most costly. Something like two million dollars will have been expended by the National Park Service and the State of Utah on about twenty miles of highway.

Encouraging, directing and cooperating sympathetically with the two railway systems that are doing so much to make the Grand Canyon region available to the public is the National Park Service. One great practical idealist succeeded another when Horace Albright followed Stephen Mather as Director. Albright is carrying out all of Mather's dreams for the Grand Canyon, and visioning a few more on his own account. Nowhere in the world do I know of another scenic shrine where dignity and reverence are such touchstones of motive and action. The Grand Canyon National Park is one of the very few places in the country where the word uplift is a reality rather than a sham.

L. R. F.

The Explorer's Club, New York,
New Year's Day, 1930.

CONTENTS

PART I

MUD AND MUDDLES ON THE HARDY

CHAPTER		PAGE
I	By Mule-team and Scow	3
II	Through to Tidewater	36

PART II

UP AND DOWN GLEN CANYON

I	Flagstaff to the Paria	71
II	Glens and Squalls and Cloudbursts	95
III	Crossing-of-the-Fathers to Aztec Creek	129
IV	Rainbow Bridge and Hole-in-the-Rock	161
V	Near Sights of Dam-sites	192

PART III

BACK TO THE DELTA

I	Trailing a Lost River	219
II	Down to the Silent Sea	253

PART IV

DOWN THE GRAND CANYON

I	Preparations and the Start	299
II	Through Marble Canyon	319
III	Hell and High Water	349

ILLUSTRATIONS

Sentinel Rock at mouth of Wa-weap, Glen Canyon *Frontispiece*

FACING PAGE

Navigation by mules— 8

And its result 8

Bringing in a deer to the camp on the Hardy . . . 8

A reclaimed ranch on the lower Colorado 9

Lighthouse Rock on the lower Colorado 9

A mired steer from my boat 56

My giant green turtle and the hitch that finished him 56

Hardy's schooner was stranded about half a mile below this point 56

The great bend in Mojave Canyon 57

Railway and highway bridges at the lower end of Mojave Valley 57

The "Cinerary Urn" at mouth of Warm Creek, Glen Canyon 132

Looking out at Glen Canyon through a natural window 133

Looking down-stream at Rainbow Natural Bridge . . 164

Aground above The Needles 165

Near the San Juan dam-site in Glen Canyon . . . 165

One of the glens of Glen Canyon opposite Powell's "Music Temple" 174

Pushing off a sand bar 175

The *"Flagship"* under full power. Left to right, Birdseye, Freeman, Caldwell, Stabler, Kahler, Widstoe, Dennis, Davis, La Rue and Wimmer . . 196

Our evening dance by the camp-fire 197

Bill Jones' forty-foot leap to solid rock 206

Lute in the prow watching for ducks 206

ILLUSTRATIONS

FACING PAGE

Surveying a dam-site in Glen Canyon below the mouth of San Juan 207

Director Davis at Diamond Creek dam-site 212

The Colorado at the foot of Black Canyon 212

The Black Canyon dam-site 213

Near the foot of Black Canyon 213

The Laguna Dam from the California side 228

Sentinel Rock dam-site, Glen Canyon 228

Hoisting out my boat at Rockwood Heading of Imperial Canal 229

The start from Pescadero Dam 229

Where the Colorado spreads over the delta below the Pescadero Cut 260

In the Pescadero Cut, by which the Colorado was diverted from Volcano Lake 260

Sharp's Heading, where I portaged from the Imperial Canal to the Alamo 261

Where the Colorado nears the Gulf of California . 261

Wheelbarrow portage at No. 9 Heading 292

Arrival at the end of the jetty from Mullet Island . 292

Where the channel of the Alamo leads down to the Salton Sea 293

The outermost post in Salton Sea 293

Grand Canyon party at Lee's Ferry 308

Comanche Point at sunset 309

Flashlight of radio in Marble Canyon 324

A placid stretch of upper Marble Canyon from the rim 325

Looking out from a cave in Marble Canyon 340

Surveying in the lower Granite Gorge 340

Up-stream view of Diamond Creek dam-site 341

Church Rock in Glen Canyon 341

Geologizing under Deer Creek Fall 356

Measuring the flow of Deer Creek 357

PART I

MUD AND MUDDLES ON THE HARDY

Down the Grand Canyon

CHAPTER I

BY MULE-TEAM AND SCOW

My earliest memory of the Colorado is of thin, slithery mud; likewise my latest. The one has to do with dragging a mule-team out of the bottomless bottoms of those winding back-channels of the Colorado called the Pescadero and the Mesquital, the other with dragging a boat for a mile through the thin red slime of silt that rims the Salton Sea. Linking these together—across a dozen years or more and as many degrees of latitude—is a series of equally soft and slushy memories. Soft and slushy in a literal sense, I mean. Whatever other emotions the Colorado awakens in the breast of a man, it does not inspire sentimentality. It is the links of this memory chain —the bright along with the rusty—that I am about to set a-jingle. The earliest, as I have said, has to do with trying to navigate the Hardy by mule-team and scow.

The Colorado, one of the most single-purposed of streams where it has a set task before it such as gouging out a thousand feet of Grand Canyon every aeon or so, is also one of the most unstable-minded when it comes to a place like its delta where there is considerable choice of ways and means. Spreading

over hundreds of square miles in flood season and draining away with the recession wherever the silt-laid dams of the year before offered the least resistance, the river has crisscrossed the great cone of its delta with an endlessly intersecting series of back-channels and overflow sinks that make travel by any established course all but impossible. The remoteness of this region and the difficulty of penetrating it for any distance conspired to convert it into one of the most remarkable game refuges that this continent can have known in the last half-century. At the time of which I write, indeed, it is probable that no place in the world with the exception of the remoter regions of Africa harboured so great a variety of wild life. Besides birds in endless variety and countless numbers, there were found two species of wild pig and three of deer, mountain lion, wildcat, lynx, coyote and jaguar on the delta proper, with antelope along the foothills and mountain sheep but a few hours climb beyond. Beaver, also, there was, and with no law against the trapping or shooting of it. For fish there were mullet, catfish and the so-called Colorado River salmon in the fresh water channels of the delta, with the famed *papagallo,* rival of the tarpon for gameness, sporting in the briny shallows of the Gulf below.

It was the lure of this riot of wild life that first drew me to the Colorado delta. The outstanding ambition of that particular stage of my adolescence was to possess a trophy room. Not one in name only, but a room whose walls bristled with horned and hairy heads of the fruit of my trusty rifle.

Since the extent of my trophies at this time consisted of a wildcat skin and two soup ladles made from the horns of mountain sheep, the discovery of game on the Colorado seemed to me a special intervention of Providence to bring speedy and complete fulfilment of my ambition.

It was "Arizona Charley" Meadows who winged the magic word. Meadows had been cruising for a month about the upper Gulf of California in a sloop, and on his return to Yuma had dropped a few casual facts respecting his trip for the hungry reporters. Cannibals on Tiburon; fish that would leap like tuna while the sun glistened on streaming fins like the feathers of the tail of a rooster; clams that held a man's foot in their giant jaws; a tidal "bore" that would grind a boat to kindling beneath its thunderous onrush; deer as big as cattle, with horns like the spreading mesquite; lions strong enough to drag a mired cow out onto the bank; wild boar that could lay open a horse's belly with a single upflirt of a mighty neck; flocks of geese and duck that darkened the sun in their flight: these were a few of the little parenthetics Charley slipped in incidental to the development of his main thesis, the utilization of the island of Tiburon as a cattle range. Only a few—but enough. The decoration of my trophy room was assured, and from a fount almost at the backdoor.

Transportation was my first serious worry. Not transportation of myself to the of action, but transportation of my trophies back from there. It would be easy enough for me to float down the Colorado with my outfit, shooting to left and right as I went,

but how to get the hides and heads back to California was so much of a problem that I finally hied myself down to Yuma to get the first-hand advice of "Arizona Charley" in the matter. Charley was away with his Wild West show, but his brother Moberly was on hand with a ready solution of my difficulty. Mules was the answer; navigation of the delta by mules instead of by boat. From cannibals to cougar, Moberly had photographs to prove the plenitude of everything mentioned in Charley's interviews. He assured me that there would be no difficulty in killing or capturing as many specimens of each as I desired. Transportation *out* was the real crux of the matter, and the mules would solve this. A mule-team would take me in from Calexico to the heart of the game country, and then, while I spent all my time in shooting, the outfit could be engaged in shuttling back and forth between there and the border. It would bring replenishment of ammunition and supplies on the in trip and carry trophies on the out. Above all, I must be sure to keep a large supply of salt on hand for preserving the heads and skins until they could be rushed out to the waiting taxidermists. The latter, warned by wire from Calexico of the dispatch of each shipment, could be waiting with cleared decks. Thus Moberly Meadows, and fairly well to the point I must admit; that is, except for the assumption of the usefulness of the mule in the navigation of an overflow country. The unseaworthiness, or rather, unmudworthiness, of the mule was to prove the weak link in the chain.

An attorney friend, also with budding trophy

room ambitions, arranged to join me at the last moment. What he called his mothatorium was rather less in the incipient stage than my own. But although—with a stuffed bear, an antelope head and a mountain lion rug—he had something like a tangible start, there was still much blank wall and floor in his trophy room which it seemed a pity to miss filling from the imminent plenty of the delta. We would shoot together, dividing expenses and trophies fifty-fifty. My partner's legal knowledge—to be used in the event of international complications arising from the movement of trophies over the border—was to be offset by my contribution in the way of preliminary scouting. It was a well-devised plan—save for the mules.

I cannot name offhand any one of God's creatures that would seem to have been created for cross-country transportation in such a land as the delta of the Colorado. Perhaps the *carabao* or water buffalo would come nearest to approximating the ideal common carrier for that land of hard blue skies and soft black mud; or perhaps a sufficiently domesticated hippo would stand the gaff. They would be able to get about a bit, that is. To approach anything like perfection either animal would have to be crossed with a dirigible balloon, or at least fitted with a gas tank to boost buoyancy.

But if some such hybrid as this were at one end of the list, certainly the small-hoofed Mexican mule would be at the other. In truthfulness I cannot go quite so far as did my partner when he said that the little brutes we chartered at Mexicali would go

in to their knees in the lake of a mirage and up to their bellies in a fresh fall of dew. It was not quite so bad as that, but almost. Let the water-table of the last overflow come within a foot of the surface, though capped with never so hard a crust of baked clay, and their flint-sharp hoofs would puncture that epidermis of indurated silt and be prodding in soft mud at the second step. And once down, getting them back on *terra firma* meant unhitching from the waggon and a half hour's work with a block and tackle. It was a rough job and, perforce, we had to use rough methods. Often we struck at the mules, and occasionally they struck back. And incessantly, and in loud voices, we called them names.

We were still many miles from the heart of the game country, but even had we been in the middle of primeval Africa the aura of unrest that floated about us would effectually have precluded any stalking. We were making more tracks than we found, and much deeper ones. Afraid to push ahead into an ever-profounder morass, we compromised between that and a direct retreat by turning westerly toward the base of the Cocopahs, heading for dust and deliverance. That turning point must still stand as the farthest south for mule navigation into the overflow area of the Colorado delta.

From where we turned it looked as though one might throw a stone to the fantastic scarps of the Cocopahs, rising (as it seemed in the level rays of the morning sun) just beyond the next patch of mesquite. But throwing a stone is one thing, and dragging a mule-team quite another. We were

Above—NAVIGATION BY MULE—
Center—AND ITS RESULT
Below—BRINGING IN A DEER TO THE CAMP ON THE HARDY

Photo by U. S. Geological Survey

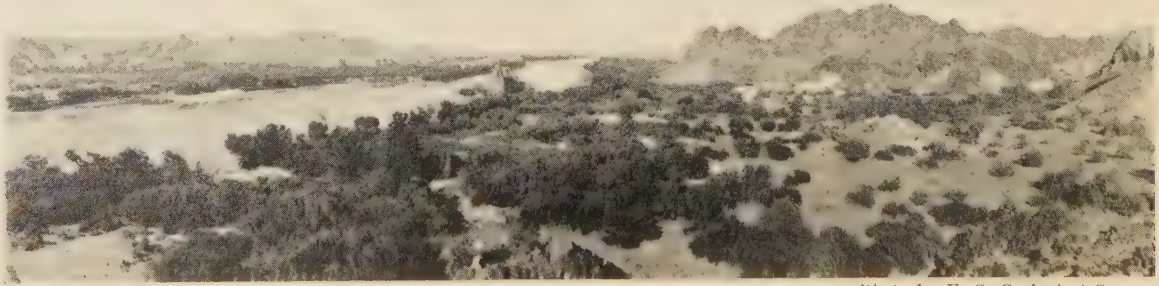


Photo by U. S. Geological Survey

four days reaching the first rising ground; four days spattered with mud and spangled with profanity. We said many harsh things to the mules, and they replied after the peculiar manner of their kind. All in all, I must give them the credit for winging the more incisive repartee. Human cuticle is not intended as armour against the mulish hoof. Scarred of body and draggled of spirit, we made camp where an Indian village crowns the farthest-pushed front of a cloudburst moraine from the pass to the *Laguna Salada* and held council.

The Indians told us that a wheel-track leading northward along the base of the mountains led to Mexicali without touching the overflow area. The same track, skirting the mountains to the south, led down to the head of the Big Water. But to the heart of the country where the game abounded there was no road that man could follow save that of the sinuous channel of the Rio Hardy. Somewhere—they could not say how many miles to the south—the Hardy found its way to the Great Red River, and at one place or another along the route would be found all those animals of which we had come in search. Somewhere down that way, also, they could not say just where, was a cattle camp with a white *patrone* whom they thought might be counted upon to furnish conveyance for the return journey by way of the dry road along the mountains. In case we wanted to go by the river, they knew of an old boat, brought down at the season of flood and now lying half buried in the mud at the bend below.

The diametric divergence of the course of the

northbound road and the southbound river brought about a dissolution of partnership then and there. My companion, stating that he had a law practice that required occasional attention, pointed out that it wouldn't do to put himself out of touch with it by pushing off down a slough that might (and probably did) peter out in the tule flats a hundred miles from nowhere. I held that no kind of practice I could conceive of could be fairly weighed against having a fine big room the walls of which were as closely set with the heads of game as its floors were strewn with their furs. I really meant this at the time. It was not until some years later I learned that the one could be quite as much of a nuisance as the other.

And so we came to the parting of the ways. I plumped for the river road, the golden trail of romance that led to the haunts of cougar and cannibals, jaguar and *papagallos;* my late partner turned back to the track that led by the alkali flats to Mexicali, and so to home and law practice. In the distribution of assets, he took over the mules, and I the unconsumed grub, ammunition and goodwill, which latter was to include the privilege of free legal assistance in the event of complications arising over the matter of the movement of trophies across the border. Dissolution of partnership complete, we celebrated the event by departing for a three-day sheep hunt in the high Cocopahs, leaving to the Indians the dual task of rehabilitating the used-up mules for the road and the banged-up boat for the river. Thus ended what I am certain must have

been the first and last attempt to navigate the depth of the delta of the Colorado by mule-team.

That would have been an extraordinarily successful hunt if only we had brought down all the sheep we shot at. *Ovis montana* were very plentiful in the Cocopahs at that time and comparatively easy to get at. The trouble was with the Indian whom we took along. Monanza was a seer and a mystic rather than a guide; also he was over-temperamental. He spun us wonderful yarns regarding the import of strange rags and tatters of mirages that were floating about the sky, but couldn't keep itching fingers off the trigger of his old forty-four the moment a sheep silhouetted against the skyline. Despairing after repeated failures of ever making him understand that a rifle was intended for execution rather than noise, we gave up and returned to camp on the afternoon of the third day out. An hour later, having watched a snail-crawling mule-team out of sight in the mesquite to the northward, I was pushing off into the languidly moving current of the Rio Hardy.

In a class by itself in all riverdom was this Hardy's Colorado of the time of which I write. For two months of the year it flowed backward and carried fresh water from the flood of the main Colorado. At the height of this overflow it lost its identity as a river and formed only the deepest portion of a great inland lake several hundred thousand acres in extent. For the next three months it drained the brackish waters of this lake back into the Colorado

and the Gulf of California, at the end of that time being little more than a great lagoon or bayou, from fifty to three hundred feet wide and, by its winding, a hundred and fifty miles long. The lower seventy-five miles of this were tide-water; that is, the high tides at the full and the dark of the moons of the spring and fall months were perceptible at that distance from the point where it merged with the main Colorado. As a consequence of the fact that these tides carried inland the backed-up flow of the Colorado rather than the ocean brine of the Gulf, the waters of the Hardy were fresher at high than at low tide.

The latter phenomenon was accounted for by the fact that the Hardy was fed by drainage from mud and salt-water volcanoes that are located about thirty miles south of the International boundary line and a somewhat greater distance west of the main Colorado. When the high tides backed up the latter they merely served to temper the strongly saline qualities of the capricious stream which drained Volcano Lake. Salt water from the sea was never forced more than a few miles against the strong current of the Colorado, and even the waters of the remarkable tidal "bore," which at times ran for many miles up both the Hardy and the main river, were not salty far beyond the head of the Gulf proper.

I should explain, perhaps, that this imposing array of facts anent the Hardy was only gathered in the course of the study and observations of subsequent years. At the moment I pushed out into its sluggish

current the Hardy was to me only a mystic river of enchantment, lined with golden willows and wild animals and swept by a devastating wall of water called a "bore." It came from a place where volcanoes spouted hot mud and it went to a place which produced live cannibals. Between the volcanoes and the cannibals were to be killed or caught everything that the heart of the right kind of a youth could desire. And I was going to make a clean sweep of the lot and bring them home to my trophy room. Didn't I have two hundred-pound sacks of salt to preserve them, hides, hoofs and heads? I know now that it was only the autumnal tints of the over-arching willows reflected in its placid depths, but to me that evening the Rio Hardy was a river of liquid lucent gold.

There is one good trait that the Cocopah Indian has in common with most others of the not always noble race of red men, and although it is in the form of a negative virtue, it must nevertheless be checked up to his everlasting credit. I refer to the amazing self-control which enables him to refrain from speeding the parting traveller with a lot of useless warnings. It seems an utter impossibility for the average white man to keep from trying to frighten and confuse his brother who ventures into the Unknown. The less he knows in fact the more dire are his warnings of lurking dangers. Many a day and night of useless waiting and apprehension I can trace to no other cause. Perhaps the untutored savage cannot work his imagination fast enough to keep up one of these running streams of fabrication without pre-

vious preparation; at any rate, it is much easier breaking away with a cheerful heart from an Indian than from a white man.

These Cocopahs gave me but one warning and one direction. The first had to do with *"el burro grande"* which I was supposed to encounter somewhere along the way. I told them that I was through for good with mules as far as delta navigation was concerned, and so wasn't interested in rounding up this particular *burro,* no matter how *grande* he might be. It was not until some time later that I learned that *"burro"* was their designation of the tidal bore. This did not matter, for Meadows had already warned me of the menace of the great tidal wave from the Gulf and I was determined to be on the *qui vive* for it in any event. The direction the Indians gave me was in connection with digging for water by the river when my canteen gave out. This proved entirely wrong and cost me two very trying days of thirst.

My boat turned out to be a rectangular box, four feet wide and about eighteen feet long. One end, supposed to be the bow, was sloped up in order to offer less resistance to the water. The oarlocks were holes between pieces of boards nailed to the sides. The oars were lengths of inch board nailed to willow saplings. There was a foot of difference in their lengths, and the shorter of them had been broken and repaired with a couple of rusty nails and a shoestring. The craft was not exactly an Argosy (or at least it does not appear to me such at this day), but still it had a capacity for a considerable freight in

the way of Golden Hopes; also, which was of more practical importance, for several score of heads and hides. Boat room was not going to be a matter of serious worry. If any difficulty was going to arise on the score of room it would be through lack of spare waggons or pack animals at the cattle camp.

It was four in the afternoon when I pushed off and, anxious to make substantial progress before dark, I set myself to the task of working out a system for the use of the ill-matched oars. There was less current than I had hoped for—hardly more than a barely perceptible set, in fact—and I soon saw that it was to be a rowing trip to the end unless the tide came to my rescue farther along. Just where the tide would begin to make itself felt was a matter of some doubt. On the vague and impressionistic map that Moberly Meadows had drawn me, the head of tide-water was indicated as in the vicinity of Charley's Bend, the name he had given to the S-shaped loop where I embarked. It seemed reasonable, therefore, for me to count on having its downward flow to help along very shortly. The incoming tide, as Meadows had described it, rushed upstream all at once in the form of a great breaking wave. This I was planning to let pass while I tied up in some sheltered bend, and then, when the back flow to the Gulf began, to push out and take advantage of the swift downward current.

An hour passed by, and still nothing to speak of in the way of a current had made its appearance. I was making fair headway rowing, but the work was wearing, nevertheless, especially as the long oar was able

to outpull its stubby crippled brother about two-to-one. A rest and supper on the bank suggested themselves as welcome diversion, with a starlight row later to put me into sleeping trim.

It was an evening fit for the heroic mood of one who stood upon the brink of the Golden Land of Enchantment. Sinking behind the jagged peaks of the Cocopahs, the sun had set the west aglow with shimmering scarves of fluttering scarlet. Almost savage in its intensity where the radiating streamers threw the fangéd pinnacles into blank silhouette, the all-pervading light was softened to a pink-violet where it impinged upon the purple shadows of the valley, and this in turn, mellowed in filtering through the yellow screen of the willows, bathed the river in an ethereal glow of rosy gold. I did not learn about it until later, but it was just the kind of golden rose they use in a Drury Lane pantomine when the hero is about to set off upon High Adventure. It was a lighting worthy of the occasion.

A cheerful fire of glowing mesquite knots, a brace of quail, rice and raisins with maple syrup, and a pot of fragrant coffee lent the climacteric touch. Resuming my seat in the boat, I started off again, consumed with an immeasurable content that made the absence of a favoring current and the jerking of the cranky oars matters of negligible moment. A half hour of erratic pulling marred the perfection of the mood somewhat, but there was still the weird beauty of the night and the eerie strangeness of the winking ebony water to keep up interest.

Suddenly I brought up against a snag in mid-

stream and swung around several times in getting clear. Ah! here at last was the current; not a swift one, to be sure, but at least with enough movement to take the boat steadily on its way. Now I could afford to rest awhile and watch the stars. And such stars as they were! Surely one could ask for nothing more delectable than just lying back and following them in their hide-and-seek with the nodding branches of the willows. But hold? What was Sirius doing on my right, and Venus and the Cocopahs on the left? And what business had the boat to be heading straight under the North Star? The tide must be running up the river, I told myself, and I must have become confused in my directions while spinning round that confounded stump.

Being a hero, nothing would do but that I should make up for the lost distance, even in the teeth of the current, before I tied up for the night. Trimming the boat for a serious and sustained effort, I leaned my weight upon those rheumatic oars and for the next hour pulled hard and doggedly. The channel bent and wound upon itself, and familiar stars appeared now upon this side, now upon that. Sure of my direction, however, I kept right on with my wobbly one stroke on the right and two strokes on the left, followed by one little corrective pat on whichever side it was needed to keep my argosy on its midstream course.

After a while I began to get my strokes to synchronising better. My speed increased. Down a long straight stretch I came at a clip which I told myself was more than creditable under the circum-

stances, determined to land at the bend and tie up for the night. Around the curve I swung, pulling hard for a fitting finish. Heading in for the bank at what appeared a likely landing I came suddenly upon . . . nothing less than the embers of my camp-fire built at that inviting spot a full three hours previously.

The current, such as it was, had been downstream all the time, and the bending of the river, confusing my orientation, had given me more than an hour of the hardest kind of pulling to get back where I had started from. Which incident impels me to state that the Snake River of Wyoming and Idaho, which, rated by some as pursuing a decidedly sinuous course, appears only in the first stage of crookedness compared to the Hardy.

Writing of the Snake, someone has said that it ran along for a while and then turned round and ran beside itself to see how well it had done. I quoted this observation to a cowboy whom I subsequently met down near the main river. He, sniffing contemptuously, replied that this was nothing to the Hardy. The Hardy, he swore, ran beside itself all the way to the Gulf and, what was more, made every man beside himself who had anything to do with it. He opined further that some day the Hardy would get to hating itself so for not getting along faster that it would go mad, break through its own banks and start chasing its tail like a cat in a fit. It was written that the Hardy should perform some very wild and unorthodox antics in the course of the next decade, but none, I believe, that took quite the form

of this particular spasm. The fact remains that the Hardy was, and still is, very crooked.

Still heroic, I resolved to make the current take me back at least a part of the distance I had already traversed twice, let the risk from the tidal bore be what it might. Making up my bed in the bottom of the boat, I pushed it away from the bank once more and prepared to turn in for the night. Just as I was about to doze off one of my hands came in contact with a pool slushing about in the bilge near my head. Reminded that I had forgotten to investigate the nature of the water of the Hardy since embarking, I touched the tip of an explorative finger to the end of my tongue. To my unbounded surprise and consternation, the digit tasted sweet almost to stickiness. That was about the last straw, I told myself, for I surely was justified in feeling that the river had exhibited quite enough eccentricities for one evening. I was prepared for anything reasonable, but not for the water turning to syrup. Getting out on my hands and knees, I proceeded to creep about and investigate. In the stern I pawed into another pool of water. At first this also seemed to register saccharinity, but that was only because I had taken my sounding with the same syrup-coated finger I had used for'ard. A direct lap of a sample cupped in the palm of my hand revealed neither sweetness nor yet the mild brackishness of the river, but a tongue-withering brininess.

These divergent phenomena were distinctly unnerving. Quite ready to find that my bed, like Lot's

wife, had turned into a pillar of salt, or perhaps, as in the fairy-tales, to a sugar-plum baby, I crawled back and bit the corner of a Navajo blanket. That, to my great relief, tasted normal. Not that I had ever tried to masticate a Navajo blanket before. I only mean that the *petit morceau* I set my teeth into tasted—well, about as one would expect a wisp of wool to taste after it spent most of its life as the corner of a Navajo pack-blanket and *hogan* rug. What I drew my reassurance from was the fact that it was a *reasonable* taste, not like chewing candy or pickling solution, for instance. After vainly seeking for anything that would account for the eccentricities of a boat that persisted in leaking the bitter with the sweet, I abandoned myself to my blankets and the fitful sleep of the tired but perplexed. Not until the next morning, when I began rummaging for the salt and sugar bags which the Indians had hastily thrown into the bottom of the boat, did I find the proper solution of the puzzle.

The great tidal bore, against which Meadows had warned me so strongly, had been much in my mind during the evening, and my last thought before dropping off to sleep had been to wonder if I was not foolish in running the risk of meeting it on the open river, in the dark and unprepared. It could not have been long before daybreak that I was awakened by the sound of water lapping against the side of the boat and, somewhere ahead, the noise of a more violent splashing. Thoroughly aroused in an instant, I rolled from my blankets, seized the oars and began paddling madly with the idea of reaching the

lee of a huge pile of drift which loomed darkly against the sky a few yards ahead.

For a few moments it seemed that effort would be of no avail, for before the old scow was well under way there came a rush of air and a roar of water out of the darkness, followed by the slap of unseen waves. Each succeeding wave struck with a sharper impact. Now they began to splash over the side, and I felt that it was only a matter of moments before the crashing comber, which I heard roaring toward me through the impenetrable blackness ahead, would reach and overwhelm my sodden old craft. Fear lent strength; too much strength, indeed. The long left oar only pulled off one of the boards upon which it pivoted, but the crippled right brother snapped at its old fracture and left its blade dangling at one end of its shoestring wrapping. With the boat wallowing helplessly a dozen yards beyond the protecting wall of the drift, I gave up the fight and waited for the blow to fall. For fully a minute I hung thus suspended upon the tenterhooks of apprehension; then the roar began to recede and the slap of the waves to die down. Presently I became aware of the beating of wings and the cries of myriads of birds. Then I realized that dawn was breaking and that the feathered life of all the river was awake and stirring.

Daylight found me more mystified than ever. Why had the bore gone off in the direction from which it had happened to be coming? Meadows had not told me that the destroyer was in the habit of turning back at the sight of frightened heroes in open boats. Or had my ears deceived me? Had I been

going upstream all the time, and had the great wave come along from behind and passed me in the dark? Perhaps, I told myself finally, the whole thing was a dream conjured up by my nerves and the unusual conditions under which I was trying to sleep.

I was about ready to admit the truth of the dream theory when my eyes chanced to rest upon my shotgun case in the bow of the boat. The even sheen of its tan surface was blotched and spotted with water, and on examination all of the rest of the outfit in that part of the boat proved to be soaked. Then I noticed that the banks of the river were splashed and spattered for a height of four or five feet above the water-line. That exploded the dream theory. Giving up the mystery for the moment I patched up my broken oar and started to paddle on.

At the end of the first bend I came upon a foundered boat, half-submerged in the mud of the bank. The boat itself was smashed beyond all hope of repair, but under the broken thwarts I found a first-rate pair of nine-foot ash oars. This was the best kind of luck, and as I pulled smartly off down the winding channel in the grateful warmth of the morning sun, I tried to persuade myself that the remarkable happening of the night had been in the nature of a special intervention of Providence to prevent my passing those sorely needed oars in the dark. I became almost confirmed in this belief when I found that a quarter of a mile below where the disturbance occurred the banks were not wet above the water-line.

Two miles farther along I came upon the solution of the whole mystery. Driven by the new oars,

the old tub was floundering around a bend at a spanking clip when, glancing over my shoulder to get a line on direction, one of the strangest sights I ever beheld was revealed. The impression conveyed to my mind by the first glance was of the river being strewn with Gargantuan popcorn, scattered thickly as far as the eye could reach. The next instant a hundred thousand pelican had risen as one bird, and the raucous shrilling of their combined screams, the beating of the countless wings and the splashing of the agitated water smote on my ears with the roar of a tornado. And those were no mean waves that the rushing multitude set running in its flight. For a couple of lively minutes I had my hands full keeping the rocking boat from shipping more water than was good for the guns and blankets. Doubtless this was the same flock into which I had floated just before dawn.

If anyone is sceptical respecting the possibility of a flock of these birds raising a commotion of air and water which might be mistaken in the dark, at a first experience of it, for a tidal wave or an incipient tornado, let him think of the noise that a half dozen ducks stir up in leaving a pond, and then consider that a pelican weighs from six to eight times as much as a duck, that it has often a spread of wings six feet across, and that flocks of these birds occasionally pack the sloughs and lagoons of the Colorado delta from bank to bank for half a mile.

After a half hour's row for a warming up I pulled in to the bank for breakfast. Here I discovered what it was that had made the water in the bottom

of the boat taste so queer the previous evening. The sugar, being intended for human consumption, was a total loss. The two big sacks of rock salt I set up to drain and dry, reckoning that a bit of moisture ought not to affect seriously its preservative qualities.

With the last of my mysteries cleared up I was now free to take a more considered and rational view of my surroundings. For some time the river had been gradually changing. Here it was much broader than above though apparently quite as deep. The banks, instead of running sharply up at an angle of forty-five degrees or more, now sloped gently back, but were softer and less easy to walk upon. The willows, which had formed an almost unbroken tunnel above, now grew only in patches, their solid wall being replaced by a thick growth of *carrisa,* a species of cane somewhat resembling sorghum. On the dryer ground beyond the *carrisa* appeared the tops of mesquite, ironwood and *palo verde,* the grey-green foliage of the first predominating.

That I was at last coming to the innermost heart of the game country was evidenced by the fact that the tracks of a half dozen or more species of animals showed in the plastic surface of the strip of mud beach where I breakfasted. Those of pig and deer were very fresh and both of astonishing size. In one place a lynx or wild cat had been fishing. There were tracks both above and below the water-line, and, back a few feet, a neat round depression with the mark of a stub tail in the middle, where he had sat at ease upon his haunches and enjoyed his catch.

After breakfast I pushed off again into the lazy

current, and for half an hour laid back at ease and smoked, making little movement and no sound. Duck came spinning down the river in tight little flocks of a dozen or so, flying hard but very low and offering fine sporty shots. I recognized teal, mallard, widgeon, spoonbill and canvasbacks, and there were doubtless other less common species. I floated almost into a flock of white geese before a bunch of raucous-throated loons gave the alarm and set the example for a flight that the others seemed hardly to have reckoned worth while. A beaver slapped the water with its tail somewhere ahead and I raised on my elbow just in time to see the widening circle of the splash. A movement of what I had thought to be dead branches in the brush above focussed my glance on what proved to be a fine upstanding buck. "Head like a young mesquite." I repeated Meadows' words as I reached for my rifle, but he had bolted before it was at my shoulder. The gun was still in my hand when my eye was drawn to a moving object that was running along the water three hundred yards ahead. It was on the right bank, and coming toward me. For a moment, from its size, I thought it must be a mountain lion, but its darker colour and "high" way of running told me that it was a wildcat or a lynx even before it showed me a side view and a bob tail. But what a cat it was! I have seen many a cougar that was smaller, and as for lynxes, never a one worthy to run in the same woods with it.

On he trotted toward me, and down I floated toward him. He was bulking bigger every second. I

dropped down into the bottom of the boat, rested my rifle on the side and followed him through the sights. At a hundred yards something seemed to smell wrong, for he halted uncertainly and snatched a hasty backward glance over his shoulder. Reassured, he came trotting on again, but with suspicious sidelong jerks of his high-held head. At the end of another hundred feet he espied the boat and brought up sharply, head in the air and hind legs doubled for a spring of retreat. I had been waiting for a shoulder shot, but contented myself with what I had.

With the leap of a hooked tuna, the big cat sprang straight into the air at the bite of the bullet. He must have started spinning to the right at the flash, for that spasmodic leap landed him in the water three or four feet away from the bank. Confident that he was mortally wounded, I dropped my gun and took to the oars, watching him over my shoulder as I pulled. For a few moments, indeed, he floated as though already dead. Then, seeming to revive at the touch of the cold water, he began to flop and bite and snarl, beating the surface to a foam in his struggles. Before I had covered half the distance to him his floundering had gained a footing in the mud of the shallows, and an instant later he went bounding up the bank into the *carrisa.*

The boat went spinning back into the stream as I jumped ashore, but, trusting to a propitious current to land it on my side of the river, I took off after the lynx. A trail of water and blood led up the steeply-sloping bank, and I followed this into the *carrisa,* not doubting that I had a long chase ahead.

There was real surprise, therefore, in being greeted with such a sputtering yell as only an animal shot through the lungs and mad with fear and pain can utter, and in feeling the rip of claws on my leather leggings and the still more intimate crunch of a pair of jaws on my knee. Frightened as I was (and no hero was ever worse scared), I still had sense enough to shorten up the hold on my rifle and fire point-blank into the sizzling ball of energy folded about my feet. Lurching back at the shot, I kicked my encumbered foot free and regained the open.

Perhaps the worst shock of all was the sight of my knee, the left one, upon which the cat seemed to have expended most of his effort. The legging was splashed with blood from top to bottom, while the unprotected knee above was weltering in clotted gore. For a moment I would have sworn that the leg was half amputated, perhaps hanging only by a shred. I seemed to recall cases of that kind, in which the victims continued to keep up on excitement after they had been chewed through and through by bears or lions. My own case proved not so serious. A hastily stripped knee showed hardly a nibble. The heavy leggings had fended the worst of the attack, and the blood upon them was not my own.

That brought me face to face again with the entirely disagreeable duty of following up my quarry in the cane. After the shock of that first encounter it was a distinctly unpleasant task from every angle. But telling myself that the prize was too great a one to lose, and that, anyway, there couldn't be much fight left in a lynx that had received two soft-nosed

bullets, I finally forced my reluctant feet upon the trail. I took no more chances of stepping upon the wounded animal. Poking ahead into the thickly-growing *carrisa* with the muzzle of my rifle at every step, I felt my way along almost inch by inch.

I might well have been hours in running him down had it not been for that first shot through the lungs, which kept him coughing and enabled me to follow the sound. Several times I heard him crashing away from my approach, but my blind shots in that direction seemed to have no effect. When I finally came up to him he was trying to climb into the topmost limbs of a half-dead *palo verde*. He looked so thoroughly spent that I decided to try to snap him with the little camera I always carried ready in the pocket of my hunting coat against just such an opportunity. He was losing his grip on the light branches even as I clicked the shutter. I had kept the rifle under my arm all the time, but I shot without raising it to my shoulder on the off chance of hitting him in the air. Of course the shot missed, and the chase had to be resumed.

The coughing had become hoarser and more sputtery now, so that I found it easier to follow. But still a clear sight for a shot was denied me. Finally the trail doubled back near to where it started. Breaking out of the *carrisa,* my quarry came to bay under a spreading willow in the comparative open of the river bank. His chest had been pierced by my first shot, and the second, grazing the spine, had left his hind legs all but useless. But the fighting spirit was unquenched. With savage fury still gleaming

from the vitreous eyes that were already glazing, he reared himself on his powerful forepaws and coughed out the dregs of his defiance. I exposed another film on the doughty fighter before dispatching him with a final shot. I decided that I should have him mounted just like that, dragging legs and all. I even thought of calling it "The Last Stand," the words to be engraved on a neat little brass plate conspicuously displayed.

Confident (as I am still) that I had killed a lynx of record-breaking size, I decided to postpone skinning the carcass until it had been measured and weighed. This could be done at the cattle camp, I reckoned—in the event, as I hoped, that objective were reached the following day. Retrieving my boat at the end of a quarter of an hour's walk and a muddy wade, I tossed the great grey body into the stern and pushed off after further adventure.

As it was no part of my plan to make birds a feature of my trophy room, I had not intended shooting any more of these than I wanted to eat. A single shot gave me more plover than I needed for lunch, with a couple of snipe thrown in for good measure. Then a lone mallard, refusing to swerve in passing over the boat, offered temptation too strong to resist. Winged by a lucky shot from the hip, the bird fell almost at my feet. That suggested a sporting line of demarcation, I told myself. I would shoot only such birds as *ought* to fall in the boat if stopped at the right point. By midafternoon I had dropped a couple of dozen ducks, two geese and a curlew; also three loons and a mud hen. Although none of the

lot fell in the boat, I picked up all of the edible ones in the certainty that they would make a welcome addition to the *cuisine* of the cattle camp.

The only bird that I did manage to make fall into the boat was a pelican. He came floundering down with a broken wing, spilled a bill-pouch of live fish over my lap and then tried to replace them with an equal bulk of my bare leg. I had to choke him to death to make him let go, and even then it was only a compromise. The semilunar gash on the bulge of my calf looked, and bled, as though it had been done with an ax. Knowing there would be no use in trying to make the cowboys eat pelican, I was about to throw this fellow overboard when I was suddenly reminded of somebody or something. Unable to recall any of my friends who looked like a pelican I started delving into other memory files. Finally I found what I was after under "History." The Spaniards had found the Indians of the Gulf of California using robes made of the breasts of the skins of pelicans sewed together. These robes were said to have been both warm and light, and, the pelican breast being very tenaciously feathered, capable of withstanding the roughest service for years.

Fearing that there would be very little chance of my obtaining one of these interesting and useful antique robes from any of the Gulf Indians I might meet, I forthwith decided to make one for myself. I would shoot the pelicans as I drifted along, and the cowboys at the camp would doubtless cut me some thin strips of rawhide with which to sew the robe. Perhaps the antique motif could be heightened

by sewing in Aztec characters with green duck feathers or some similar material.

Vastly intrigued with the clever idea, I promptly began shooting pelican. Or rather, I began shooting *at* pelican. The first flock let me drift down to within fifty yards, but even at that comparatively close range No. 4 shot seemed to have no more effect than to ruffle their feathers and tempers. They called me a good many names as they kicked their way out of the water and rose in flight, but were not too disturbed to settle down again a half mile farther down. They became restless at my approach after that, however, and a shining snowfall of feathers was all my hard-pumped shotgun could bring down. That forced me to trying long distance shots with my rifle. Though I probably never hit the particular bird I aimed at, two or three others always seemed to find their way in the course of the flat-nosed bullet and so remained for me to pick up after the flock had jumped off for another stage down river. By evening the pelican stratum in the stern had completely overlaid that of the ducks and geese, with the big lynx completely submerged.

It was about sunset that my shot into a rising flock of pelican was answered by a crashing of the brush on the right bank and the appearance of a badly frightened bunch of deer. They were of that big rangy species called *veneda* by the Cocopahs, and even the lengthening shadows did not conceal a number of amazingly fine heads carried by some of the vanguard. They were fair marks as they huddled uncertainly at the fringe of the willows, but before

I could replenish my empty magazine they were down the bank and into the water, swimming for the other side. That took them directly into the shimmering path of the setting sun, which may partly account for the fact that I missed a dozen deer with half a dozen shots at not much over a hundred and fifty yards. They struck the farther side at a point where the seepage from an overflow sink had reduced the bank to a slide of soft mud. The leaders seemed to flounder through fairly smartly, but left behind them wallows in which those following mired badly. A belated bullet into the ruck in the mud seemed to find its billet, for as I grabbed the oars I saw a big buck with a splendid spread of horns go over on his side and cease struggling. I was speculating as to how my prize could be most effectively mounted as I pulled in to make it secure.

Just what became of that big buck I never learned. I arrived to find a wallow of slowly heaving mud that was almost soft enough to row in. A pair of muddy heels were just disappearing in the *carrisa* as the boat eased in against the settling bank, but whether or not they were those of my quarry I could not be sure. Trying to follow them I went in to my ears at the first jump, luckily without my rifle. Having retained the painter in my hand, there was no great trouble in wallowing back to the boat. I tried a few half-hearted prods with a pole on the off chance of striking something that felt like venison, but with night coming on and a coating of black mud to be removed before supper I did not care to undertake extended exploration. Indeed, if that buck had con-

tinued sinking at the rate I started to, it would have needed a deep-sea sounding lead to locate him at the end of the ten minutes' handicap he had.

Pulling on until I came to a firm pile of drift, I bathed on a submerged log, donned a change of clothes and was ready for supper. It took some effort to burrow down through the pelican strata to the ducks, but it was justified by teal stuffed with mushrooms and roasted in a Dutch oven. Smoking and dreaming by the camp fire until the moon came up, I made my bed in the bottom of the boat and pushed off again for another night of drifting. Until I had more conclusive evidence that the bore ran up that far I was not going to let it bother me. I was anxious to reach the cattle camp the following day and a night's run of current might take me a good part of the way toward that objective. I dropped off to the tail-slappings of sporting beavers and the distant strains of a coyote chorus.

The boat must have been aground for some time when I awoke a little after daybreak. I was sure of that, for otherwise a coon would not have been perched on a nearby snag daintily nibbling at a fish. More significant still was the fact that a beaver had become so used to the presence of the boat that he had turned his back on it while gnawing the bark from the trunk of a willow. The tail of my eye told me that there were deer farther down the river, and I also seem to recall hearing the gruntings and wallowings of pigs. It was the beaver that held my attention, however, and I fumbled for my gun without once losing sight of his sleek brown back. The

beaver was hard to trap but harder still to shoot; I had heard old trappers admit that. And here was one with his back turned to me.

It was too easy a shot to miss, and I didn't miss. But a beaver will reach the water with his head shot off, and once in the water the fat heavy body will invariably sink. This fellow was no exception to the rule, which was the reason I had to crawl out on the drift pile against which the boat had grounded and prod the shallows for the body which I knew had to be there. Locating it presently with a stick, I reached down into the three-feet-deep water, grabbed hard into the first piece of fur I touched and hauled away. The kindly little cherub that sits up aloft with no other care than to fend fools from the consequences of their folly has had to intervene in my behalf a good many times, but never has he acted to better purpose than when he directed my fumbling fingers to pretty well up toward the nape of that dead beaver's neck rather than to its tail, leg, or any other part of its anatomy whatever. Had my fist been closed anywhere else than into the neck the pair of scimitar-like ivories that flashed and clashed on empty air would have met the slightly but not (to them) materially greater resistance of my wrist.

Not knowing at the moment (what I learned a year or two later) that it is safer to grab a bear by the tail than to try to pick up a beaver, I was perhaps less disturbed than I should have been. Not having an ax within reach, I tried to deënergize my fistful of potential trouble by beating its head on a log. Unluckily it was the fist itself that suffered the con-

tact, so that my grip relaxed and my pet escaped. Concluding from the liveliness of the latter that he could not have been the one I had shot, I did some further prodding and finally fished up—this time with an improvised boathook—a mutilated brown body. The skin was a good deal messed up from the spreading "soft-nose" but, reckoning that the taxidermist would be able to put that little trouble right when his turn came, I tossed it upon the heap with the birds and lynx.

The deer and pigs had evidently scattered at the sound of my shot, but the little coon stood by for the whole performance. Fish in mouth, he had backed off to a strategic point of vantage on the edge of the *carrisa* and seated himself to watch the antics of the new kind of beaver-catching animal. He even refused to take permanent departure when I came out and started a fire for breakfast. Peeping out cautiously from time to time, he followed cooking operations with cocked ear and questing nose, finally even advancing a couple of yards and sniffing at a piece of syrupy flapjack. I have no doubt he would have been eating out of my hand with another day or two in which to get acquainted.

CHAPTER II

THROUGH TO TIDEWATER

For the last ten miles I had noticed an increasing number of dead and dying fish lodged against the drift piles and along the banks. I was quite unable to account for them at the time, but have since concluded that they were either fresh water fish with which the brackishness of the Hardy did not agree, or else salt water fish which found the lack of salinity uncongenial. Birds of all kinds were gorging themselves upon this easy prey; so also, apparently, the pigs, the wallows of which were now in evidence all along the water's edge. As it was a hulking wild boar that I wanted above all other specimens for my trophy room, these signs of the presence and plenitude of the festive *javelina* were more than welcome.

Pushing off after my fight with the beaver, I was just taking up the oars when the sound of a great crashing in the dry tules to the right warned of what I took to be the coming of a calvacade of wild pigs. Greatly to my surprise nothing larger than a lithe half-grown lynx came bounding out upon the bank. It must have been his gambollings that were responsible for the racket he made in coming through the reeds, for he continued to play with himself or an imaginary comrade all the way down to the water. Here a torpidly moving fish brought a new interest into his life. There was a gleam of silver as a swiftly

flirted paw tossed it into the air, and another when he caught and threw it with a back-flip of head. Next he retreated backward, spitting explosively and pretending to be afraid; then returned and, prodding with a paw, tried to play cat-and-mouse with it. It must have been the click of my cocking hammer that made him grab it in his mouth and settle into a suspicious crouch. I took no chance with a body shot this time. The bullet through the forehead must have killed instantly. He lurched forward into the water, retaining in his dying grip the still faintly breathing mullet. I left the latter in the clenched jaws, hoping that it might prove practicable to have fish and fisherman mounted together.

It was not farther along than around the next bend that a young buck, after watching my drifting approach from a screen of low-hanging willows, lost his head and plunged into the river almost in front of the boat. It was an easy shot and I had no trouble in placing a bullet where it accomplished its work without mutilating a very pretty head. He was of the species the Mexicans call *"burro,"* possibly on account of its large ears. I was less keen for a specimen of that variety than for one of the so-called *veneda,* probably the largest member of the deer family proper on the North America continent. Confident that the cowboys would enjoy the venison, however, I loaded this one into the boat. It could be easily got rid of if a better specimen turned up.

Trimming ship to balance the weighty body of the deer, I took again to the oars. The willow patches were becoming scarcer and scanter, and a mixture

of tule with the *carrisa* indicated that I was entering a region more and more subject to overflow. The seaward set of the current was barely discernible, but there was still no evidence of a recent movement in the opposite direction. Wet and sliding banks, however, suggested that there must have been some tidal movement not long previously.

A swirl of buzzards in the air directed my attention to a point a quarter of a mile ahead where a considerable pile of drift had accumulated against the bank. The shimmer of reflected sunlight told of sliding mud, and presently I saw that the drift was piled at the mouth of a *barranca* draining down from some extensive sink. The whorl of screaming scavengers focussed upon a heaving yellow mass milling in the mud, and that, in turn, was concentrating upon some central object of interest. So densely packed was the jam in the mud that it was not until I had pulled down to within a hundred yards that I made out for certain of what it was composed. Even then, indeed, it was auricular rather than ocular evidence that furnished the revealing clue. Such "whoufings" and snortings as that could only come from pigs fighting over food. *"Javelina!"* I breathed ecstatically, shoving the magazine of my "Thirty-thirty" chock-a-block with cartridges.

It was indeed a bunch of true javelins I had surprised. That became certain beyond all doubt as I drifted closer. We had been told in Calexico that the pigs of the delta were descended from a herd of domestic porkers turned loose by the Blythe estate in the 'eighties. That may have been true of the

pigs found near the line, but these rangy brown-yellow brutes that were fighting there in the mud over the body of some mired animal bore every mark of having run wild from the beginning of time. Those stilty legs, gaunt barrels, high shoulders and long lean snouts would have taken a hundred generations of wild life to evolve from a tubby Berkshire. So, too, the bristling humps and the great back-curving tusks of the boars. I have always felt sure that the *javelina* that ranged the lower Colorado delta fifteen years ago was as true a wild pig as any to be found in Asia or Africa. That he was larger and fiercer than the peccary of the Gulf states there is no question.

What the savage bunch were fighting over I never did learn, but the clean-gnawed and partly dismembered skeleton might have been that of a deer, or possibly a far-strayed steer. My opening shot was at the half-masked shoulder of a huge boar that was trying to break away from the ruck with a bone in his mouth; the rest at the mob as it scattered. Only one animal—a comparatively small one—appeared to be fatally wounded. The big boar, though plainly hard hit, managed to wallow up the bank and into the cane. He was protesting mightily in intermittently mud-staunched squeals as he floundered through the mire, but these were nothing to the bedlam of high-keyed yells that broke out a few moments after he disappeared in the *carrisa.* The whole bunch seemed to have joined the revered patriarch and started squealing in sympathy. If I had had the experience of wild pigs then that I had five years—or

even five minutes—later I would have known that they were not a sympathetic race.

The sweet little cherub that had acted as the handyman of Providence in easing off the shock of my contact with the beaver and the lynx must have taken a hasty hitch at his belt and prepared for instant action when he observed that I was pulling into the bank and getting ready to land. There are as many ways of hunting the wild pig as there are peoples who find zest in the chase of him, but none of them deliberately contemplates going about the thing without at least some one hovering in the offing to pick up the pieces for the folks at home. The Anglo-Indian officer reckons that there is a certain amount of risk in meeting the wild boar of the Punjab mounted and with a spear, and the Marquesan, taking the rush on foot, always has support in reserve in the event his own cutlass thrust fails to reach a vital spot. For actual lone-hand pig hunting I had realized the only practicable plan in floating down a river and shooting from a boat. That the lone hunter should remain in the boat I had yet to learn. I wanted to finish that big boar and take him home for my trophy room. My principal worry was on the score of dragging the great body down through the mud and getting it into the boat.

I had to pull back upstream for a hundred yards before finding a point where the bank was solid enough to bear my weight. The mud was knee-deep all the way up to the cane, but the footing was firmer once I reached the higher level. The porcine

chorus was working up to a crescendo as I pushed along through the *carrisa,* so that there was no difficulty in keeping the proper direction. The reedy growth thinned as the distance from the river bank increased, and it was in the comparative open that I reëstablished contact with the pigs. They had backed the wounded boar up against a gnarled mesquite trunk, and the sympathy I had sensed was taking the form of eating his violently protesting anatomy. As the unconsumed portions of him still showed unmistakable signs of life, I gave the hideously mutilated body the benefit of my first bullet. Even then my only apprehension was a fear that the splendid head had been ruined beyond the wizardry of taxidermy to rehabilitate. Such is the way of real innocence.

The mob scattered at my shot, just as when I had fired at them in the mud; scattered, and then came back again like swarming flies. It was the noise of the shot rather than its effect that appeared to disturb them. Most of them turned to and continued to lavish sympathy upon the remnants of the dead boar. Not over a half dozen seemed suddenly bitten with the idea that there might be something edible behind the "Big Noise." There was no hint of fear in the business-like way they came nosing in upon me; only a slight suggestion of indecision, as though they were still somewhat in doubt as to the wisdom of leaving a feast in the hand for one that might lead them a chase into the bush. They did not rush me, but rather advanced with a deliberate noncha-

lance that suggested that they knew perfectly well what to do and how to do it, when once they decided it was worth doing.

Innocent as I was of the ways of the *mundo javelina,* I at least knew better than to try to stop a pig with the glittering human eye. I shot twice, and shot well. A pig crumpled up with each bullet. I have no doubt that the third shot would have been just as deadly, for I felt myself perfectly in hand—until the hammer snapped down with a metallic clank and I realized that the magazine of my rifle was empty. I had neglected to replenish it since first opening fire on the river.

The conventional thing to have done, of course, would have been to climb a tree. All story-book hunters do that, sometimes before, sometimes after breaking the stocks of their guns in hand-to-claw combat. Unfortunately for convention, the only tree in the vicinity was pretty well ringed with the pigs performing the last sympathetic rites over the body of the big boar. Moreover, "Run!" not "Climb!" was the imperious command winged me by my little celestial guardian. Beyond all question it was the best, nay, the only thing to do. What the order lacked was explicitness. It was too general. If it had included a course or bearing I should undoubtedly carried it out with much greater neatness and dispatch. As it was, taking what instinct told me was the most direct course to the river and safety, I broke through the cane to land in the slithery-slick mud of the drainage *barranca* at the end of ten yards.

The immediate porcine periphery, scattering at my last shots, evidently found temporary diversion in guzzling the flesh of their newly fallen mates. At least none of them reappeared until I had rubbed the mud out of my eyes, effected a hasty orientation, and started to climb up the farther bank. Then, bloody of eye and jowl, they began to filter out in questing twos and three and settle down at convenient vantage points along the rim of the *barranca*. There was even a sort of quiet post-prandial languor in their movements, as though relaxation and entertainment were nearer to their hearts than the grosser delights of feeding. Doubtless, too, past experience had made them confident that mired quarry could not readily escape; that, since they were already gorged to repletion, there was no reason why they should not lie at their ease for a spell and gloat. I could hardly miss the offensive contemptuousness of such an attitude, although, busy as I was with a new and pressing problem, I could not but prefer passive surveillance to active pursuit on the part of the pigs —gloating to gorging, that is to say.

The new and pressing problem was one in applied aquatics: in short, how to swim in soft mud. Wading was out of the question. I had proved that in trying to climb out on the bank—the one opposite to the pigs, I mean. Not any of the mud appeared to be underlaid with anything like solid bottom, but where the thin slush in the depths of the depression would at least permit one to circulate and splash in it, the stiffer mixture on the slopes simply closed in

round a foot and tried to drag it deeper. So, bad as it was for the gun, I gave up the idea of climbing and started to swim.

It was not real swimming, of course, not a swift, gliding Australian-crawl sort of a progress, but rather a pawing flounder on all-fours, a wriggling squirm in many directions that resulted in a slight mean of linear movement in one. The first ten feet were the hardest. Then my form began to improve, so I could hardly have been over ten minutes in oozing through the next fifty feet. Here, with my toe resting on a submerged snag, I paused to ponder a new problem, namely, whether or not to throw away my rifle. It was proving no end of a hindrance and might possibly become a prohibitive handicap if the *barranca* did much turning and twisting on its way to the river. On the other hand, a gun butt would be a mighty handy thing to club pigs on the snout with in case they persisted in coming to close quarters. I was still in a sufficiently heroic state of mind to thrill at the thought of that story-book last stand with a clubbed gun. That must have been how I came to pat my chest and discover a breast pocket full of cartridges. And these brought up another problem.

Of course I knew better than to fire a shot through a mud-clogged rifle barrel. There was nothing debatable on that point. What I did ponder was the possibility of cleaning that barrel. With the gun once in shape to fire, I reckoned that I ought to be able to kill enough pigs to keep the cannibalistic survivors busy while I made a comparatively unhurried

wallow on down to the river. It certainly seemed worth trying. Blowing and sucking the muzzle accomplished little beyond filling my mouth with a vile blend of mud and gun-grease. Squirting through water from a little well I scooped in the mud did better as far as the bore was concerned, but the first cartridge I tried to work back from the magazine jammed hard and stuck fast. Rather more in petulance than in sorrow (for it was almost impossible to carry in the mud) I tossed the useless weapon well out on to the firm ground of the non-pig side and resumed my oscillating ooze down the *barranca*.

Freed of the cumbering rifle and with a constantly improving mud technique, I floundered on with steadily accelerated headway. The slush grew softer and softer as I churned ahead until, below where another slough joined the one which I navigated, there was a good foot of comparatively clear water overlying the mud. Better still, the fringing willows of the river were now in sight a hundred yards ahead, with the water of the slough broadening—and probably deepening—all the way.

Engrossed in and elated at the success of this novel navigation, the pigs had all but slipped out of my mind. An angry "whoufing" quickly slipped them back again. As long as my progress had been mostly up and down or sidewise they had been content to lounge and gloat. When I really began to get a perceptible way on it was another matter. Repose-fulness gave way to restiveness, and that to surly concernedness. As I picked up speed in the deepening slough, some of the more belligerent boars, snort-

ing and gnashing their tusks, began crowding into the mud as though about to lead an active sympathy drive. I deeply regretted the disabled and discarded rifle at this juncture but, remembering that the bark of the gun had appeared to frighten the pigs more than its bite, I did my lustiest to make a noise like an exploding shell. The imitation was not technically perfect, but what it lacked on that score it made up in volume. The mob did not scatter but it certainly did pause. I, on the contrary, did not pause even to yell—just kept lunging right ahead with a bellow between every stroke. Now and again the roar descended to a burbling blubber as the overworked exhaust of my mouth scooped water or mud, but the arrestive effect could not have been greatly lessened. The enemy was still gnashing in indecision and bafflement as my vigorous hand-over-hand carried me out into the river. The swim upstream to the boat got rid of most of the mud save that I had swallowed. When, loading up the magazine of my pump gun with buckshot shells, I went back over the bank to retrieve the rifle, the pigs were out of sight and sound.

I got the rifle cleaned out and working again just in time for a shot at the leader of a large herd of *veneda* that started to swim the river about noon. The bullet through the neck was not immediately fatal, but it left the splendid buck too weak to climb out through the mud after he had reached the bank. Throwing a rope round his horns, I dragged him alongside and dispatched him with my hunting-knife. The head was a truly magnificent one—finer than I would have dreamed anything less than an elk

could carry. Getting the great body into the boat proved an awkward job, and I finally had to go over into the mud myself to manage it.

Considerable as was the capacity of the roomy old scow, this latest addition to my cargo taxed it close to the limit. Freeboard had become reduced to near the danger line, and it was only by the most careful stowing that I made working room for my legs in rowing. If I did not reach the cattle camp within a few hours it was plain I should have to start scuttling or skinning. Not knowing much about the technique of the latter, I was anxious to defer the operation as long as possible in the hope of profiting by the expert help of the cowboys.

The last of my fresh water went into the lunch-time coffee pot. This worried me not a whit at the moment, however, for the river had been steadily crowding over toward the base of the great desert peak of Mayor, and it was there the Cocopahs had told me I should find a well. Landing an hour later, I located the hole just as described, at the rear of a deserted *wickiup*. It was full to river-level with water that was crystalline in its clearness; also of a saline content that stopped just short of crystallinity. The seepage into a shallow hole I scooped just back from the water's edge proving considerably less salty than the dip from the crystal fount, I filled my canteen there and pushed off without further delay. Reaching the cattle camp in short order was developing an interest quite outside of commanding skilled flenching help.

Passing up shot after shot in the air, mud and

water, I stuck doggedly at my oars until after the sun had gone down behind the mountain. Only once did I pause to use my rifle. This was on a hulking *javelina* that stood and made faces at me from a stranded cottonwood log on the right bank. I had no intention of stopping to collect him. It was only that something in his attitude or expression recalled the offensive manner of one of the boars that had taken a prominent part in chasing me down the ooze. The out-and-out ignominy of that muddy hegira still rankled deeply, and so I started to take it out on this particular pig, not for what he had done, but for what I knew he was not above doing if he had the chance. My hastily pumped shots all went wild. Likewise the pig, for he missed his footing on the bridging log and went over his head into a gleaming tongue of liquid mud. The remainder of his progress to the shelter of the cane was like the tunnelling of a giant mole. These was a certain poetic justice in the dénouement but, being a pig and therefore gross, the fugitive doubtless missed most of the finer points of it.

The petulance of this outbreak on my part, together with the bad shooting, was the first indication that the situation—the failure to find water and the cattle camp—was beginning to get on my nerves. Intensely thirsty from my rowing, I was still unable to force a drop of the nauseous contents of the canteen past my lips. Boiling increased rather than decreased the salinity, and a cup of cocoa made with it was of an unspeakable sickliness. Finally I mixed an half-an-half decoction of *tequila* and condensed

milk and made my supper off that. Thirst was unquenched but spirit soared. Young Ulysses was himself again. Muttering appropriate scraps of poetry anent the sunset flaming behind the Cocopahs, I pushed out again upon the darkling river.

It was a night of high resolve—for a little while. From the air came the beat of whirring wings, from the water—silver gleams in the afterglow—the plash of leaping fish; peering deer raised dusky silhouettes above the fretted cane tops of the western bank, and afar, somewhere in the sinister shadow slash of a Cocopah canyon, a coyote began his palpitant paean of praise to the coming night. On an evening like that, I assured myself, confidently settling back to the oars, it would be no trick to pull a mud-scow to a cattle camp that was atop the mountains of the moon. Doubtless the particular camp I wanted to reach was not half so far as that, perhaps no more than round the next bend; but wherever it was I was on the way, and heading into the home stretch. It was a night of high resolve—for a little while. Wonderful thing, resilient youth—and *leche condensado con tequila Mexicana!*

The cattle camp did not appear beyond the next bend, but in its place I came upon an enormous green turtle. There was just enough light to make out the arch of the great shell where it rested on a mud-submerged log halfway up the bank. Still wafted on the wings of high resolve, a green turtle was just about the only thing in air, earth or water that I could have stopped to stalk so soon after I had nailed the slogan of "Cattle Camp or Bust!" to the mast-

head. Meadows had not only waxed eloquent respecting the gustatory delights of *calipash* and *calipee,* but had also given intricate technical directions as to how a giant turtle could be harnessed to a boat and made to tow it. The secret was in striking the water with an oar—now to port, now to starboard—according to which direction you wanted your veritable Neptune's Barge to turn. You couldn't tool a newly caught turtle quite as smartly as a horse-show four-in-hand, Meadows admitted, but a docile specimen could be broken very quickly and it sure saved a lot of hard rowing. "Turtle tooling!" I let the words trickle trippingly from the tip of my tongue. They fitted with a click into my mood of high resolve. I would kill two birds with one stone by tooling the turtle down to the cattle camp and then cutting him up into *calipash* and *calipee* for the regalement of the cowboys who skinned my game.

That lapse into a vocal elucidation of my plans was a technical error and came near to compassing their defeat at the outset. Scarcely had I got the boat under renewed way than a sharp plunk from the bank told me that the turtle was also up and off. I had fifty feet to go to his ten; but flippers are not hung for speed and I was throwing a heavy wallop into the oars. It was a dead beat to our common goal, the water's edge. He drew in his head as he realized a collision was inevitable and the flat nose of my scow smote thwackingly upon the end of his shell. Then boatnose and turtle melted and merged with the soft mud of the bank.

Of course the impact of the collision sent me keel-

ing over backwards. Nothing could be nicer to buffer the force of a fall than pelican down; nothing worse than deer antlers. I know, for I hit both of them when I went backwards. Whatever sensation I should have had from the delectable contact of pelican down was lost in the impression received when the tip of the deer's horn met the tip of my ear. Temper and cuticle went together, which was probably the reason I forgot that Meadows had warned that gentleness and patience were the prime essentials of one who would break the green turtle to be a servant of man. I broke this one of sticking his head out and going forward without orders by cracking him on the snout with an oar, but that was as far as the breaking ever went, except for the oar-blade that shivered on his shell when I tried to prevent his retreating deeper into the mud.

Watching my prize dissolve into thin mud before my eyes I realized that I had made the mistake of trying to break it too soon, before I had caught it, in fact. First to catch the turtle; that was plainly the thing to do. With fading light and flushing bank there was no chance for finesse or strategy, I told myself. Direct action was what was called for. Forthwith I seized the bight of the painter and stepped lightly but firmly forth upon the arched hump of sinking shell.

There is a certain type of Swiss ice-climbing hobnail that might conceivably give a man a passing but precarious foothold upon the slime-slippery back of a green turtle. I say might, because I did not have that particular type of nail in my shoes on this, the

only occasion I ever tried to stand upon a turtle that was sicklied over with a thin cast of mud. One foot went one way and the other another. That was why, for just one fleeting moment too short in which to register triumph, I was actually astride and mounted upon my still unbroken quarry. An instant later I was down beside him, then beneath him, and finally up alongside again, blowing for wind. Contact with the mud-submerged log had checked the flounderings of both of us, and, as luck would have it, leaving me in a vastly superior strategical position. That is to say, the head and arms were on the section of me that was above the mud, while the cookie-like segment of turtle that protruded was provided only with a tail and two hind flippers. Luckily, too, I had retained hold of the boat painter through all my wallowings; also enough high resolve not to shrink from the task of thoroughly entangling that light, strong line with the sprawling flippers. It was hard to make my hitches hold at first, but I managed it finally by wiping off the flippers with my handkerchief as a mother might swab down the paws of her mudpie-making child. Then, hauling the bow of the boat in close against my stranded form, I hung over the gunwale and finally wriggled out of the mud. Pushing off with my pole, I found myself floating down the Hardy with a green turtle in tow.

Having a green turtle in tow was not, of course, quite the same thing as being towed by a green turtle. I did not let my elation blind myself to that very radical distinction. I was counting on kindness and patience to turn the tide, but deemed it best to defer

their application until the soothing contact of the rippling water had a chance to cool any temporary resentment that might have been engendered in the breast of my captive by the super-Sabine ruthlessness of my attack. Judging by the decreasing resistance on the tow-line, those first fierce flickers of resentment had all but died down and out when the crotch of a forked snag intervened to fan them into full flame again. In spite of my broken oar-blade and the fact that I was backing-water with the stern downstream, there was a very fair way on the boat at the time, so that the strain of bringing up short the three-quarter-ton's or more dead weight of game must have resulted in a very uncomfortable racking of that pair of hind flippers to which my painter was bent. I eased off the strain and manœuvred a disentanglement as smartly as the circumstances would permit, but was left with a very sore and belligerent turtle in tow. Refusing longer to be lulled Letheward by the soothing touch of the Hardy, he began darting hither and thither and yon with a force that rather more than negatived my best efforts at a forward progress. Finally he stranded the boat on a pile of drift where, despairing of inducing a relapse into docility that night, I hauled up short and started to fetch him aboard.

Everything considered, the hoisting in of that three-hundred-odd-pound case of *calipash* and *calipee* was the most bafflingly trying job I ever attempted. Both boat and turtle seemed to be in conspiracy to forestall the success of any get-together movement. When one was in position for a lift invariably the

other wasn't. Or when both were in approximate juxtaposition for action some not inconsiderable trifle like a deer's horn in the pit of my stomach would make it awkward and painful to exert my strength in an effective *yo-heave-ho!* Although the boat's resistance was passive rather than active, it succeeded in the infliction of rather more considerable damage than did the openly belligerent turtle. The steel-trap like snaps of the latter I avoided for the most part, but in doing so usually managed to impale an eye upon an oarlock or sideswipe a cheek along the slivery edge of the gunwale. Broken in skin and spirit and with the dregs of my high resolve oozing with the mud from my fingertips, I finally effected my purpose by mooring fore-and-aft to the drift pile, clambering out to a solid footing and heaving the turtle over the heeled-down side. Vast quantities of mud and water slushed over in his wake, but with still a couple of inches of freeboard when the boat was on an even keel, I pushed off once more upon the moonlit waters.

Desperately tired after my exertions, I decided to postpone further attempts at turtle-tooling until the morrow. Stabling my steed aft by turning him on his back between the deer, I tossed off a couple of cans of condensed milk and spread my blankets on an improvised mattress of pelicans. I was thirsty enough to be seriously tempted by the brackish boiled water in my canteen, but managed to bridge the interval until sleep brought surcease with the canned milk.

I could not have been long asleep when the great

peak of Mayor began to bend over and press me gently but firmly upon a huge spike planted in the small of my back. At least I thought it was Mayor while the sleep-bonds still held me fast. Struggling up through the No Man's Land of waking and sleeping I heaved a sigh of relief to find it was no more than an Incubus, sitting, as Incubi are wont, upon the chest of its victim. A blinking black pool, on my blanket quickly showed the fallacy of the Incubus diagnosis, however, and proved that I was in the clutches of a Vampire—and a blood-sucking one at that. It was a familiar steel-clicking snap grazing my upward-groping finger that shocked me fully awake and "a-wise."

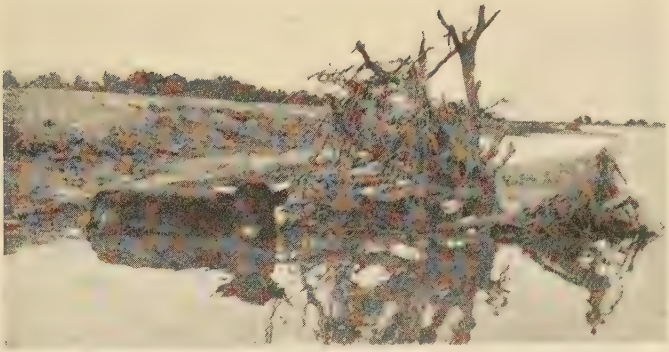
Crawling out from beneath a three-hundred-pound turtle without putting under water the side of a hair-trimmed boat is not a simple manœuvre, but I finally managed it by judicious and well directed wriggling. Disengaging myself from the spike which Mayor and his chest-pressing successors had been forcing into the small of my back proved the most painful part of the operation. The reason for this became plain enough when subsequent investigation revealed the fact that what had really impaled me was the foot-long bill of one of the component parts of my pelican mattress.

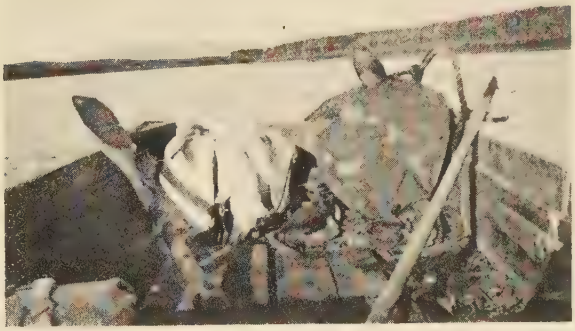
It was not until several years later that an Indian of the upper Amazon taught me how to turn a turtle upon its back so it would stay turned. On the present occasion, having failed in my attempt to do it with gravity I saw no other way than to do it with rope. And so it was rope that I used; rope woven,

twined, twisted and cinched. Standing my tormentor on end against the interlocked deer antlers, I lashed him flipper by flipper to the solidly planted prongs. Already bound fast enough to hold a baby elephant, there was really no need of a final flourish in the way of that elaborately devised neck hitch. But I had deftly noosed his extended neck as he was in the act of taking a surreptitious snap at the hand with which I was half-nelsoning his port flipper, and at the moment there seemed a certain poetic justice in making his most truculent member also the one most effectually secured. Save for the knot under the left ear, no Vigilante of Forty-nine ever adjusted a prettier-setting necktie. Making the loose end of the latter fast to a cleat on the stern, I told the disturber in plain words that he would have to be quiet or be sorry and went back to my mud-smeared bed among the pelican.

For a few minutes there were sounds of a struggle in the stern, and the boat trembled to unseen tuggings and strainings. Presently these gave way to the long chesty sighs of one who is deeply resigned. These sighs fluttered and grew fainter and soon were indistinguishable from the intermittent wing-whirrings of passing birds. "His spirit is broken," I said to myself, pulling close the blankets; "probably he will be more docile and amenable to reason in the morning." I must have dropped off myself at this juncture, for I remember no more until the lappings of wavelets awakened me in glaring daylight.

A splitting headache, a distinct feeling of squeamishness and a decided disinclination to be up and





Above—A MIRED STEER FROM MY BOAT
Center—MY GIANT GREEN TURTLE AND THE HITCH THAT FINISHED HIM
Below—HARDY'S SCHOONER WAS STRANDED ABOUT HALF A MILE BELOW THIS POINT

Photo by U. S. Geological Survey

Photo by U. S. Geological Survey

Above—THE GREAT BEND IN MOJAVE CANYON

doing were the morning-after residue of my high resolve of the night-before. But if resolve was no longer high something else certainly was, and—being not unfavourably placed to get at facts—it did not require the corkscrew whorl of buzzards circling above to tell me that the game was up in more senses than one. Anxious to enlist the expert skinning talent of the cattle camp I had asked too much of Nature, and now she had rebelled and was taking her own course. The frosty nights and cool days had stemmed the rising tide of putrefaction, but only to have it sweep on at the first breath of the warm Gulf wind that had stolen up the river during the night. Yes, the game was up, all but blowing up, indeed. My pelican mattress billowed like a fleet of young balloons and looked, as I gingerly rolled back the blankets, like a bank of cumulus clouds fanned by the Trade-wind. The deer—— But why proceed? The freshness was gone out of my young life as out of the morning.

With a tenderness of touch born less of solicitude than a fear of starting a premature explosion, I got rid of my nauseous cargo as best I could. Then, mooring to a snag, I washed down deck, took a bath, put on dry clothes, emptied the last can of condensed milk, and resumed my oars. With nothing fit to drink left, and with the banks so muddy that climbing out in search of a doubtful waterhole was no longer worth the effort, reaching the cattle camp within a few hours seemed to have become more a matter of saving my own hide than those of a lot of wild animals. An unbelievable gentleness and pli-

ability on the part of the turtle had, it is true, checked me halfway in my scuttling operations with a renascence of the idea of breaking him to drive. That last flicker of frivolity died out when I lowered him back to all-fours and discovered that the overnight docility was directly traceable to the overtautness of the necktie I had so deftly knotted under the triangle of his pugnacious jaw. Those long drawn sighs that had come to me 'twixt sleeping and waking had expressed an even supremer resignation than I suspected. "All that is left of him now is pure *calipash,*" I paraphrased, and slid him over into the fragrant wake of the beaver that had snapped at my wrist.

The marks at the water-line indicated that there had been a foot or more of tide during the night. As the current was now outward, it was evident that the rise had come while I slept, doubtless setting the boat back some distance upstream. There was consolation in the slightness of the rise. To have had the dreaded bore suddenly develop at that precarious stage would have been the last straw.

The processional fragrance of what was to have been the adornment of my trophy room had passed out of sight beyond the bend by the time I had washed down and cleaned up, but a south wind that breathed not of daisies kept it from passing quite out of mind. It was my intention to pull by and on to windward as quickly as my damaged oars would allow, but I had hardly raised the last high-floating unit of the vanguard when a low blubbering moan directed my attention to the right bank. A steer nervously trotting back and forth in the mesquite

was a welcome sign that I was approaching at least the fringe of the cattle range; but it was not from this animal that the sound had come. A renewed blubbering and a blur of movement among what I had taken to be snags and driftwood at the water's edge led me in to the bloated body of what was an-all-but-submerged cow. Snarling and tooth-flashing, a ring of prowling coyotes melted into the tules at my approach, and from the tail of my eye I seemed to catch an evanescent glint of gliding gold. I had evidently interrupted the final act of a tragedy.

With no heart for further shooting, I pulled in close to the mired cow to see if there was any way in which I could work her back toward firmer ground. With all but her back and head under water, and with strength only to lift clear the sagging muzzle for a breath, it was plain enough that a half day more would see the end, even without the intervention of the lurking coyotes and cougar. It was the thought that the cattle camp and succour must now be very near that held my hand when common sense told me the humane thing to do was to speed the quieting bullet. Firing an admonitory shot into the tules to scatter the coyotes, I took up the oars again. The weaving grey shadows at the mud's edge had resumed before I rounded the next point.

A blood-stained wallow by the water and a line of clean-picked bones at the top of the bank told me within the mile of the eventual fate of the steer that became fast in the mud. Just what were the instruments of that fate I did not learn for another hour. Two lithe yellow forms that I distinguished moving

about the right bank a quarter of a mile ahead I was not long in recognizing as cougars. Both seemed busy worrying some gleaming object between their paws. At first I thought they were feasting on fish, and this theory appeared to be borne out when the smaller of the pair, after a tense tail-swishing crouch upon the bank, sprang cleanly to what I took to be a half-submerged log well out in the water. It was not until it began to tear and rend the supposed log in savage fury that I realized it was standing upon what was left of a mired steer.

Sick at the thought of the fate my softness must have forced upon the helpless cow in the mud above, I snatched up my rifle and fired as long as there was anything in sight to shoot at. Gone as I was in hand and nerve, that was by no means bad practice. Putting two bullets into the more or less motionless figure astride the steer was not especially worthy of remark, but letting the sunlight into the ribs of the patch of yellow streaking up the bank was fairly creditable work under the circumstances. The smaller lion crumpled at the second bullet and slid off into the water. The other, snapping at his wounded side, floundered through a pack of coyotes and off into the mesquite. The lean grey little wolves, apparently not much frightened by the shots, sniffed the fresh blood trail and slunk off to imminent carnival. Fishing up the bullet-torn body of the dead lion from the water, I threw it into the stern and bent again to my crazy oars.

Even after an interval of over a decade and a half it would be distinctly painful to conjure up again

the memories of the remainder of that infernal day. I have been thirsty since—very thirsty—but never to the accompaniment of so distressing a nausea. I must have become very weak not long after shooting the cougars for, try as I would, I was never able to pull up with and past my floating menagerie into the fresh air beyond. That phantom fleet, bobbing so grotesquely down midstream, became to my inflamed imagination an elusive will-o'-the-wisp, to be eternally pursued but never grasped. Not that I wanted to grasp it again, jointly or severally; but somehow the fantastic agglomeration of fur and feathers had become the symbol of what my every drop of blood was crying out for, the cattle camp—and water. The goal I strove so hard to reach was just beyond those breeze-bumping bags of hide that floated with heads and tails so jauntily askew. Once past them, I was there.

A crazy enough conceit, to be sure; and yet that was something of the fashion after which it fell out. It was at the turn of the day and the turn of the tide. My only certain recollection of the dreary stern chase of the afternoon has to do with stopping every now and then to tell a mired steer how sorry I was that I wasn't in shape to be of any help to it. I seemed to resent it a bit that there were no evidences of reciprocal sympathy; for, sorry as I was for the steers, I was beginning to feel a deal sorrier for myself. Also there was a growing fear of and fury at the prowling lions and coyotes. Beasts that would leap out over the water to lunch upon a mired steer could hardly fail to be attracted to a weak and

weary youth in a stranded boat. So I blazed away at every skulking figure that showed along the bank, but without ever pausing to note the effects of my shots. Into a bunch of wallowing *javelina* I emptied a whole magazine. Gloating pigs were just about the last straw.

No, it was not a pleasant afternoon even in retrospect. Another waterless night would have been a deal more unpleasant, but I have never quite had the nerve to give my imagination rein to picture just how much so. I knew that the ebb of the tide on any river must take many hours more than the flow, but it seemed to me that the turn was long overdue when the approach of the notched shadows of the fantastic *pinto* mountains to the southwest heralded the coming of night. With the prowling lions in mind, I was just telling myself that a mid-river snag would be the safest place to tie up at during the rise when a salvo of shots and yells smote upon my ears from somewhere round the next bend. A few moments later, milling confusedly as though in flight before an unexpected attack, my covey of floaters came bobbing again into view. At the same instant, to the accompaniment of a renewed fusilade, a band of mounted Mexican *vaqueros* came charging along the bank in hot pursuit. Sighting the boat, they reined in their mustangs and stopped firing. Evidently the presence of a man on the river gave promise of some sort of an explanation of the barrage of dead game that was blocking the channel.

A low but distinct wave marked the head of the incoming tide, with an upstream current following it

that was much too strong to be stemmed with my oars. Realizing this after a few minutes of futile effort, I pulled in against the right bank and signalled for a tow. The few hundred yards to the camp beyond the bend were covered at the end of a horse-hair *riata.* Climbing weakly up the bank at a corduroy landing place, I was greeted in a friendly drawl by a white man who introduced himself as Bruce Casbare. Calling me by name, he said that his friend Señor Andrade, the Mexican Consul in Los Angeles, had written him I might be turning up down that way and that he had been on the lookout for several days. He hoped I had had a pleasant trip.

I replied that it had been very pleasant except for a slight thirstiness that had developed during the last day or two. The way being thus prepared, I asked if he would mind letting me have a bit of a drink. "One awready pohed fo' you," he drawled genially, leading the way to a table beneath the brush-thatched lean-to of the shack; "hope you don't mind youah likker straight. Cook used up last o' the watah this evenin' an' the *mozo's* jest gone ovah to the main rivah fo' anothah bahl."

The imp in the heart of that brimming glass of *mescal* leered mockingly at me as I reached out a trembling hand. With a weak shake of my head I settled down onto a rawhide-braided chair. "You'll have to excuse me," I apologized huskily, "but I feel too much like a tinder-box inside to dare to take any liberties with liquid fire. I—I think, if you'll let me have a horse, I'll ride over and meet the water-

waggon." Of course an empty *olla* didn't necessarily signify that there was not water on the kitchen stove, nor succulent and cooling juices in cans of corn, peas and tomatoes. The interval was tided over without Mohammed's having to go to the Mountain, but it was some years before I could face a glass of *mescal* and not flinch as before a brandished firebrand.

A round-up over Laguna Salada way had been responsible for failure to keep up the wonted river patrol for the benefit of mired cattle. Setting off at daybreak the next morning a party of cowboys rescued the more fortunate creatures that had not already fallen victim to marauders. In each case a rope was thrown to the horns of the mired animal and a powerful team of mules was used to drag it out. Every one of the befuddled brutes strong enough to keep its legs invariably rushed the nearest man or horse the instant it was free of the mud. So weak as to be easily pushed over with the hand, there was no difficulty in eluding the tottering creatures; but one couldn't help wondering at the strange mental process behind the ungracious action.

The large lion I had wounded from the boat had met grim justice in being followed and beseiged by the coyote pack that he and his mate had been fighting off from the mired steer. Cruelly torn about the abdomen from my soft-nosed bullet, the savage old warrior had made good use of jaws and paws in staving off the inevitable end. There were already two dead coyotes under the mesquite tree to which he had dragged his shattered frame for a last stand, and

three or four more, whimpering and baleful-eyed, were licking paw-smeared wounds at good safe distances from the spiteful yellow-peril. But there was a limit to which an untamable spirit could force blood-drained flesh and dying strength. Glazing eyes were giving but blind direction to numbing paws and the yapping periphery of pack must have been on the verge of closing in for the final worry even as we came galloping up. I directed my first bullet to the dying lion, while the Mexicans opened up with their six-shooters on the scattering coyotes. The latter furnished very merry revolver practice during the half minute it took the keen-eyed *vaqueros* to drop rather more than a dozen of them in the lanes between the mesquite.

Casbare explained something of the phenomenon of the tidal bore when I rejoined him in camp that afternoon. It came to its fullest strength only at the spring and autumnal equinoxes, he said, at which times it rolled upstream in a great breaking wave and brought a rise of close to twenty feet even on the Hardy. Following the equinoxes the bore lost force rapidly until, at the winter and summer solstices, it had almost ceased to exist as a wave and was evident only in a slight tidal movement. My coming, chancing almost exactly on the December solstice, had discovered the bore all but negligible even as a tide. This, since I had elected to drift down the Hardy in an overloaded boat, Casbare considered very fortunate for me. The bore at its height, he said, came crashing along in an eight or ten-foot wave, carrying a weight of water that would have

reduced my boat to kindling wood in the shallows and at least swamped it even in midstream.

At the time I was somewhat inclined to believe that my amiable host was pitching it rather strong in his descriptions of the height and force of the tidal bore of the Colorado. Indeed, such were my feelings right down to last fall, when I traversed a strangely altered delta to the head of the Gulf of California and established intimate contact with the great bore in the fullness of its power. Of that almost unique voyage—an attempt in the company of two deeply interested engineers to endeavour to trace the meanderings of a deflected and practically lost Colorado—I shall write later. It will be sufficient to state here that Bruce Casbare's descriptions of the devastating force of the bore at its height were more than conservative. So swift and swirling was even the ebb of the tidal flow that it proved far more treacherous to navigate than many of the encanyoned stretches of the upper river, while the only way to avoid complete destruction of our boat when the great *"burro"* itself came roaring in was to land well in advance and drag the light craft above high-water mark. A large decked-over boat, well moored, will ride the bore if nothing goes wrong. In the event of the least untoward accident, however, complete destruction is practically inevitable. The *Topolobampo,* capsized and destroyed by the bore with a loss of over seventy lives but a few days after we landed at La Bomba, was a thirty-six-ton steamer. Doubtless Casbare was right in saying that I was playing in good luck not to have encountered the

"burro" in its might when I drifted down at night with my trophy-laden scow sunk to within an inch of her gunwales.

At the end of three days, spent in riding and hunting with the cowboys, Casbare hitched up his six-in-hand mule-team and drove me back to Calexico. Following a track close up against the base of the Cocopahs, the overflow area was avoided throughout the whole distance, so that there were no repetitions of my own disastrous experiences in trying to navigate the delta with mules. None of the anticipated difficulties, legal or other, developed in connection with passing my trophies over the line. The United States Customs Inspector smiled indulgently over two torn and bedraggled cougar hides and a bullet-punctured *javelina* skull, wondering what in the name of common sense I kept carrion like that for. I replied that it was more for their sentimental than for their real value. And that, I fancy, is the reason I still have them.

Very few, and perhaps not any, others were destined to see the heart of the delta wilderness as it was revealed to my youthful eyes on that wholly irresponsible and almost wholly delectable jaunt down the Hardy. It was only a year or two later that the main Colorado, breaking through to Volcano Lake by the channel of the Bee, scoured out a new course on to the Gulf by way of the Pescadero and the Hardy. This had the effect of greatly increasing the length and depth of the inundation in that region, but at the same time opened up an easy fresh-water route through the one-time *terra incognita* where ranged

such hordes of wild life as few but the earliest of our pioneers have ever seen. Between floods from the river and hunters from the increasingly populous Imperial Valley, the decimation if not the extermination of the game was swiftly and surely accomplished. The completion of the Pescadero Cut last year had the effect of making a backwater of the upper reaches of the Hardy and turning the main river through a portion of the delta that has been but little explored and less hunted. But even here one will look in vain for the swarming wild life of other days. Cutting our way through last October in attempting to define the new channel of the Colorado, we saw one coon and one wildcat, scant traces of beaver and deer, and not the tracks of a single pig. It is still one of the queerest, weirdest regions that the fancy can picture, but no longer a paradise for the hunter, no longer a Golden Land of Enchantment for the youth who would furnish a trophy-room.

PART II

UP AND DOWN GLEN CANYON

CHAPTER I

FLAGSTAFF TO THE PARIA

BETWEEN my memorable infantile stunt of muddling down the Hardy by mule-team and mudscow and my return to the Colorado at Glen Canyon something over a decade and a half had elapsed. In those colourful years I had learned not a little of the ways of a vast and varied assortment of Asian, African and South American streams, but of the Colorado no more at first-hand than could be gained by a peep over the Grand Canyon rim at El Tovar or a car-window framed picture from a passing transcontinental limited. A desire to pilot a boat into the head of the Grand Canyon (in hope of ultimately piloting it out at the foot) had simmered in the back of my head ever since a first reading of Powell's story had fired my youthful imagination. This had, however, never got far beyond the simmering stage. On the only occasions the way was clear for a voyage of this kind the call of two earlier loves, the Columbia and the Yellowstone, was too strong to be denied.

The occasion for sending boats up and down Glen Canyon during the summer of 1922 arose through a desire on the part of the United States Geological Survey to complete work that had been done there the previous year. A study in Washington of the preliminary surveys of 1921 revealed a number of possible dam-sites in the lower hundred miles of Glen Canyon respecting which more complete data might

well be demanded in connection with the comprehensive flood control, reclamation and power development under consideration. E. C. La Rue, a hydraulic engineer of the Water Resources Branch of the Survey, was designated to make the requisite studies and secure the data desired.

Mr. La Rue had maintained for some time that the key to the solution of these problems would be found in the erection of the first great control dam above rather than below the Grand Canyon. Believing that a fuller knowledge of the favouring conditions in Glen Canyon could not but lead to a more intelligent appreciation of the whole situation, he conceived the idea of arranging for ten or a dozen of the men most vitally interested to accompany him on his trip.

The intimation that my own riverine interest might entitle me to a place on what was so palpably an armchair junket awakened no answering thrill, at first blush, that is. The tentative personnel of the party was a distinct temptation, as was also the thought of an intimate contact with the beauties of the incomparable Glen Canyon. What I could not quite bring myself to was the idea of sitting quiescent and watching someone else have the fun, even on that least turbulent of the encanyoned stretches of the upper Colorado. Doubtless I should have passed up participation entirely had not La Rue chanced to mention that the worst of his worries was over the matter of getting the requisite boats *up* the canyon from Lee's Ferry. Sensing something more in my own

line, I promptly volunteered to shoulder the boat problem myself.

"I already have a boss for the job, and I think a mighty good one," was the reply from La Rue, who added that he believed there might still be a place for a boatman or cook or flunkey. What would I think of going along as a boatman?

"Show me your boss first and I'll tell you," I answered. "I'm so used to being my own boss where river navigation is concerned that I might find it difficult to work under one who was not both gentle and considerate."

La Rue laughed. "'C' is Tom Wimmer's middle initial," he said, "but I doubt very much if it stands for 'considerate.' And certainly it is not for 'gentle.' However, I'll 'phone you the next time he is in the office and you can run down and size him up for yourself and give him a chance to do some sizing on his own account. He tells me he isn't going to take any chances with the men he has along this trip. Says he can't run any risk of having two or three of them play out on him, as happened last summer."

The announcement that Tom Wimmer was waiting to see me in La Rue's office came suddenly and unexpectedly the following day. As there was no time to make a proper toilet for the occasion, I had to go just as I was—in light and airy summer flannels, newly pressed. To make bad tactics worse, I so far forgot myself as to carry a stick. If I had thought, I might have buffered the jar of that flimsy bit of bamboo by affecting a limp. Even that did

not occur to me in time. Wimmer's horrified glance as I was introduced to him as a prospective boatman and roustabout told me all to late that (in his eyes) the one touch lacking was a poodle with a red bow under my arm, and a monocle. I tried to crack his knuckles in a lusty grip by way of showing what I could do with an oar, but the point of the subtle touch was lost. He rubbed his crushed fingers balefully enough but continued to register disgust and repulsion.

Meanwhile I was becoming aware of registering a certain modicum of disapproval on my own account. I rather liked the chap's fighting jaw, but a choleric eye and a sanguinity of complexion indicated a prima donna type of temperament that I had learned was not an ideal rough-water equipment. So I told him that my knowledge of outboard motors was nil, my ability as a cook somewhat less, while as for my worth as a boatman he would have to judge for himself. He took me at my word, looked searchingly at my hands—and smiled sarcastically. Nor could I blame him. At the end of a long Winter of Discontent at my desk those normally useful paws looked as pink and pudgy as baby hams. What use to tell him that they would grow hard and dirty almost over night? What use to assure him that I had a fragrantly filthy duffle-bag of river rags ready to hand at home? The cards were stacked against me from the start, and, moreover, I was rather glad of it. Why tempt Fate by risking a clash of warring temperaments? Gathering up my offending stick I stalked out.

An hour later La Rue called me up to say that I had passed muster and that he was counting on me to sign on as boatman. Wimmer, he said, had no real objections to me, save that I struck him as being too fat, both above and below the ears, and because he kind of distrusted on general principles dudes that wore ice-cream pants and silk socks and carried a cane. But he was willing to take a chance with me in the hope that I might prove an exception, especially as it looked as though it was going to be difficult to get hold of any really hard-boiled river-rats. I replied that, as Mr. Wimmer didn't seem to have any more against me than I had against him, I was willing to chance it if he was. No further objections being interposed by either party, it was so ordered.

From that time on to the conclusion of the return voyage down Glen Canyon Tom Wimmer and I co-operated to good effect. We never became, nor could become, kindred souls; yet such friction as we had was largely psychological, and therefore not greatly in evidence. I attained to a large and wholesome respect for the unflagging energy and persistence Tom put into herding that little flotilla of overloaded boats up the tortuous rock-strewn reaches of Glen Canyon; he, from the fact that he kept me always in his own boat wherever possible, must have come to certain respect for my usefulness as a river-rat and general roustabout. Our respective senses of humour never exactly synchronised, but that would have been too much to expect. I took care never to offend again with the cane and the "ice-cream"

pants, and the fat that had been complained of between my ears and heels worked off in good time. The more altitudinous collection of adiposity, being congenital and therefore incurable, had to be endured by both parties.

The practical aspects of the work ahead I went over with La Rue and Wimmer at our next meeting. The dam-sites to be studied were all located between Hall's Crossing, near the head of Glen Canyon, and Lee's Ferry, at its foot. As the only available boats were at the latter point, it was necessary that these be taken upstream to Hall's Crossing in time to meet the main party, which was to come in with La Rue overland from Salt Lake City. Between gasoline, provisions and general outfit, each of the four big skiffs to be used would have to carry a load of close to a thousand pounds. Evinrude outboard motors were to be used to provide motive power wherever practicable, but it was known there were many stretches where these would have to be helped with oars and by towing both from the bank and in the water.

La Rue's original schedule allowed two weeks for the upriver trip, with not over four or five men to handle the boats and motors. Pointing out that there was little probability of all of the motors surviving the whole distance, and that every one of them might well be disabled or worn out, Wimmer and I suggested another week of leeway and at least two men to a boat. With that much time, and that many hands, we were agreed that at least two of the boats could be worked through to Hall's Crossing even if

all of the motors went out of action. As the one thing La Rue desired to avoid above all others was keeping his assembled best minds of the Geological Survey, Reclamation Service, Mormon Church and Colorado River Commission waiting on the bank, he readily fell in with this plan. It was decided that Wimmer should have his boats and crews ready to push off from Lee's Ferry on the 17th of August, and that Hall's Crossing must be reached before the 7th of September if we had to wade and tow the whole way. It was a stiff program even at that, but —with good handling and not too much bad luck— a perfectly feasible one. Arranging to meet Wimmer and the rest of the outfit at Flagstaff in time to get away with the truck for Lee's Ferry on the 14th of August, I packed off to the Grand Canyon for a week of conditioning.

Climbs in and out of the Canyon by the Hermit Creek and Bright Angel trails, and a hike by the suspension bridge to that little gem of a Harvey Camp called Phantom Ranch, did much toward the induration of soul and body that I was bent upon effecting before starting on the up-river grind from Lee's Ferry. Still more arduous was a clamber from Flagstaff to two of the thirteen thousand-feet-high summits of the San Franciscos. This drastic treatment cost me much shoe-leather, more cuticle and induced a terrific muscular soreness. But it also transferred two inches from my waist to my chest, blackened my hide and stiffened my back and spirit; in short, made it possible for me to look Tom Wimmer in the eye when he breezed into Flagstaff with

the rest of the crew. Tom blinked in surprise at the torn and bloody knee of my riding breeches and grinned approval. The more Time and attrition and the river took toll of those once jaunty Bedford cords the better he seemed to like me. I only wish he could have seen them two months later at the head of the Gulf of California!

The railway strike and the consequent tie-up of train service had upset not a little the ordering and assembling of our outfit. Only three of the four Evinrude motors were awaiting us in the freight shed, while the local oil station, due to failure to receive instructions in time, could not provide us with the high-test gasoline so desirable for running the engines at their utmost efficiency. The truck that had been hired to drive us in to the Ferry was laid up for lack of spare parts believed on the way from Phoenix, while the leading food emporium reported that the provision list had not even been received.

To one who has had experience of the petty and interminable delays that inevitably turn up to postpone and re-postpone the departure of an outfit that is leaving Civilization for the Back of Beyond, the well-directed energy Tom Wimmer displayed in getting our caravan under way within twenty-four hours of his arrival in Flagstaff will be readily apparent. Another truck was found whose owner was willing to risk it on the sinister Lee's Ferry traverse. For gasoline there was nothing to do but put up with two hundred and fifty gallons of the highest test on hand. Three or four hours of hustling in the grocery department

of the big Babbitt store brought a complete and not too badly packed grub supply to the loading platform. The missing Evinrude could not be replaced, that is with a motor of similar weight and power. Its absence simply meant that a light but powerful little Elto I had brought along for a spare would have to be hooked up for wheel-horse duty at the outset.

We got away immediately after lunch on the 14th. Tom, who had been over the road, led the way with his own car, into which was also packed the remainder of the crew with the exception of myself. I rode with the driver on the seat of a heavily overloaded truck. Leaving the main highway, the road wound north through the aromatic yellow pines of the Coconino plateau to a pass over a shoulder of a buttress of one of the Franciscos. Passing Sunset Mountain with its permanent oxide-of-iron afterglow, we reached the summit just in time to collide with the outflung fragment of a thundersquall tossed off from a black-browed parent snowstorm that was raging about the ancient craters of the San Francisco *massif*. Out of the mud at the end of a mile, we coasted for a while through flower-strewn mountain meadows and then turned into an undulant ribbon of road that swept in broad curves across a cinnamon-brown slope toward the heliotrope cliffs beyond the Little Colorado.

Tom's crew, evidently a rough lot, sang noisily as his old car bumped along, punctuating their booming choruses with frequent shots at dove and quail from pumpguns trained to port and starboard. Evidently

Tom had signed on a real bunch of hard-boiled river-rats after all, and they were celebrating their departure after the manner of proper deep-water sailors. Every time I heard them guffaw I told myself that Tom was regaling them with a description of my ice-cream pants and bamboo cane. No doubt I was going to have a lot to live down before making my honour white with a gang of roughnecks like that.

Crossing the gorge of the Little Colorado on a suspension bridge, the driver took the occasion to recite the well-worn classic of the man who had fallen into that sometimes raging stream and got all—dusty. The yarn is on tap at various and sundry *arroyo secos* in the arid Southwest, but perhaps at none with more point than at the Colorado Chiquito. Literally a raging torrent of enormous volume at seasons, there are many months in the year when great stretches of its cliff-walled bottom do not flow enough water to slake the thirst of a tarantula. That by the Cameron bridge is one of the dryest reaches. As we left the bridge I could see where the white sand was drifting unbrokenly from wall to wall.

We were now in the Navajo Indian Reservation. The main road and telephone line wound on to the Agency at Tuba City. Leaving these a mile beyond the bridge, Tom turned off on a more northerly course that for some distance ran almost parallel to the river. For a while we ducked and dodged among the hillocks of black lustreless lava which, seeming to absorb the dazzling sunlight, was as easy on the eyes as it was hard on the tires. Presently a delicate

rose-lavender mist began to form ahead, shot with whorls of more vivid blue and terra cotta where the dust clouds from Tom's invisible car marked its sinuous course. Bumping over a low saddle between rounded chocolate hummocks the truck descended in a swoop to a slender outflung tentacle of the Painted Desert.

There are points in the *Desierto Pintado* where the hot colours seem fairly to sizzle, fairly to stream across the earth in flaming scarves of scarlet and carmine. Several such fierce furnaces of colour I had descried from the summits of the Franciscos—lurid pools of light that threw the reflection of smouldering fires even upon the noonday clouds. But of such was not the softly tinted corridor by which we had entered. Here the celestial artist had taken his colour *motif* from the cool quietness of autumnal skies and autumnal seas. Blues tempered with soft greys seemed almost to reach out a spirit hand to soothe the tired brow. Of the fluttering blue of the gas-flame was the haze that welled up from the *barranca* ahead, and like the gas-flame that slaty-azure mist was fringed with streamers of sulphurous yellow. Just why we discovered presently.

In endeavouring to make a detour where a sheer cut-bank had sliced off a section of the road, Tom's car had stalled against the low hummock formed where the wind had piled dust over what appeared to be a buried log. Indeed, it *was* a log, and a big one at that; but not until the willing crew had attacked it lustily with all four of the new axes was it revealed

as a *petrified* log. Of course sparks of several kinds were a-twinkle and a-dance, thus accounting for that particular little patch of sulphurous blue haze.

The *Camino Real* to Lee's Ferry became a broken thing of rags and tatters for a while after that, and if picturesque and lurid language count for aught that particular neck of the Painted Desert came in for a considerable augmentation of its colour scheme. Now it was the truck that had to be helped with brush and pushing shoulders, now the car. The crew proved hard and earnest workers, both with backs and lungs. There I met them on common ground, with the slope perhaps just a bit in my favour. Only one of them out-beefed me in bulk and none of them in profanity. They were just simple, direct one-language cussers, who spat forth what they had to say (not without a certain *esprit,* to be sure, but still with little follow through) and then began and said it all over again as fresh occasion arose. Myself—but modesty forbids. I had simply had ampler opportunity and made the most of it. I felt sure I detected a dawning respect in the eyes of those rough fellows as we pulled up out of the last bad wash along toward sunset, and knew that if only there were enough things to cuss at on the way up-river I was going to make my way with them.

Anxious to make up for lost time, Tom continued running on a constantly improving road for a couple of hours after the incandescent golden-rose of the sunset flush had ceased to glow. It was after nine o'clock when he finally pulled up by the well of a Navajo trading post called "The Gap." A first

camp is always trying, principally on account of winnowing out ill-segregated provisions. Made at night after a hard day's travel it is still worse. On this occasion, however, the unquenchable good nature of the crew triumphed over all petty difficulties. By ten we had suppered bountifully on dove and quail and were smoking contemplative pipes on newly spread beds. And then for the first time the crew and I had opportunity for real heart-to-heart contact. Only a surreptitious cleaning of finger nails by a chap called Lute, the cook, prepared me for the shock of the sequel. Every last ruffian of the lot, including Tom's son Andy and myself, had undergone and survived the rigours of a university course. Every one, moreover, appeared to have had a more or less outstanding athletic record. Bill Ramsaur had been at California the while I pursued my precarious studies at Stanford, and had coached the football team of the old Los Angeles Athletic Club the year I had coached the University of Southern California. Andy Wimmer had gained distinction on the University of Utah eleven, and Bill Jones claimed several jumping and hurdling records. Just what they were I don't quite recall, but they were all destined to be pretty nearly broken before the trip was over; also Bill's neck. None of the lot except Tom, Andy and myself had ever been nearer a river than the top of a railway bridge. The Ramsaurs were near-oil magnates and Bill Jones some kind of a landed proprietor in the San Fernando Valley. Tom and I had been ranchers when we last worked; likewise Andy. River-rats!

Just how Tom came finally to trust his fortunes to so insouciant a bunch of amateur river navigators he tried to explain once or twice, but never quite clearly. The fact that the only really experienced boatmen on the Colorado could be numbered on the fingers of one hand had something to do with it; also the fact that you can't expect to hire a man for money to work sixteen hours a day without risking occasional mutiny. Mutiny two hundred miles from the nearest sheriff is a serious thing, especially with a schedule to maintain. There were two experienced rivermen at the Ferry Tom expected to get—young Mormons who had worked with him the previous year. With one good boatman in each skiff some latitude could be taken in the choice of flunkey, and Tom took it. This worked out about according to plan, except that the river-sapient Mormon boys did not become available.

Off at daybreak the following morning, we climbed through a forest of fragrant scrub cedar to a divide before commencing the long easy descent to the plateau above Marble Canyon. Streamlets trickling from springs in the lofty cliffs on either side formed verdant little oases around which clustered the slab- and wattle-built *hogans* of the Navajos. Bright-eyed and bright-garbed shepherdesses, exploding with suppressed giggles, cleared a way for us through the clustered masses of their frightened sheep; gay young bucks, riding with the easy seats and hands of the true Bedouins that they are, cut circles about us with their pinto ponies; wrinkled squaws nodded gravely above their blanket frames in response to our wav-

ing hands. Our swift passage was like the cutting of a revealing cross-section of the daily life of these most spirited and attractive of American Indians.

Skirting a clearing in the broadening valley, we sighted a bunch of scurrying riders who appeared to be either just finishing or starting a horse race. Black, the truck-driver, corrected my surmise to that effect by pronouncing it a Navajo "chicken-pull." Asked what that might be, he said it was a hard thing to describe, especially when using both hands for driving, but added that he could at least assure me that it "wasn't no game ever invented by chickens." Further questioning elicited the fact that the game consisted of trying to pluck a buried chicken from the ground while riding at full speed. As the earth was firmly stamped down around the fowl's body, with only the head being left out for a handle, a successful pull was no mean feat of horsemanship. A driver, reaching too far from the saddle, often overbalanced and went rolling on the plain. That eliminated him from the competition even if he did not break his neck. The buck successfully pulling up the chicken was privileged to keep it; also—what was rather more important—the considerable pile of blankets, saddles, bridles and other silver knick-knacks pooled by the competitors as a preliminary. The same chicken could rarely be used twice, Black said. I agreed with him that the game was never invented by a chicken, though admitting that I had seen specimens of the genus flapper that looked as though they had sprung into being after some such Jovian fashion. Black, grinning sheepishly, wondered if that

was how the pullet got its name. Funny thing how two men rattle along on a desert traverse.

Tom, when we stopped to help push his car out of a steep-sided gully, pointed to a wall of colour-splashed cliffs blotting the northern skyline, and said that they were beyond the Marble Canyon. The main Colorado flowed our side of them, he added, but sunk thousands of feet in a sheer-walled gorge. The more imminent wall to our right was an unbroken extension of the Echo Cliffs, which we would skirt all the way to Lee's Ferry.

By an unbelievably baffling feat of riverine wizardry the Colorado continued to conceal its existence until the very instant we wheeled out upon the brink of its encompassing cliffs. By not the slightest of dips, by not the faintest of shadows, was one warned that the smooth, gently sloping surface of the plateau was broken by a section of the profoundest of the world's great gorges. One would almost have sworn he could walk blindfolded to the foot of the vermilion-streaked wall that the absurd map showed to rise a mile or more beyond the inner gorge of Marble Canyon. Not even Soap Creek Rapids, one of the savagest riffles in the whole length of the Grand Canyon, revealed its presence by sign or sound.

> "A sudden little river crossed my path,
> As unexpected as a serpent comes."

Although somewhat off scale, those lines of Browning's picture vividly the ultimate spark-flashing materialization of the Colorado. One moment the river wasn't; the next moment it was. One moment

the truck was bumping across an apparently unbroken plain, the next it had stopped on the rim of a cliff that sprang sheer from a red-brown flood of surging water. Upstream receding red cliffs marked the foot of Glen Canyon; downstream a sinister black crack marked the head of Marble Canyon, the real beginning of the Grand. Directly opposite a sandy stream-streaked wash, with verdant patches of cultivation on either side, identified the valley of the Paria, and the one-time ranch refuge of John D. Lee, leader of the fanatical force of Mormons and Indians responsible for the Mountain Meadows massacre of the 'fifties.

A sharp succession of badly washed zigzags took us to the beginning of the historic old Mormon "dugway," constructed in the 'seventies by the forerunners of the westerly moving cohorts of Brigham Young. Blasted out of the solid rock of the cliffs in days when powder was scare and expensive, this mile-long gash above the river had never been intended to furnish more than a precarious route of passage for pack-train and mule-team between the Ferry and the open plateau. Autos had negotiated its out-shelving curves on occasion, but not without serious risk. For trucks it had hitherto been rated as the head of navigation. Camp was made at the outer end of the "dugway," and the goods transported to the Ferry landing by waggon. Since in our case this would have involved a day's time that we could hardly afford to lose, no serious objections were raised when Black, quite on his own initiative, volunteered to drive his outfit right through to the Ferry.

At this juncture, not to appear backward, I did a bit of volunteering on my own account. Climbing down from the seat and suggesting that it might be a lot safer if someone ran along behind and blocked the wheels with a rock, I volunteered to undertake that important duty myself. I didn't say who or what I thought might be safer, and if the others wanted to infer it was the truck I had in mind, of course they were welcome to. What I really was driving at was the complete disassociation of my own fate from that of a driver who was bent on flying in the face of Providence and probably the bosom of the Colorado.

Black—thanks to the fact that his truck was new and his nerve as steady as his hand—made the Ferry without mishap. Perhaps it is a mistake to make the feat a matter of public record. If anyone with a less adequate mental, physical and mechanical equipment ventures to duplicate it there is almost certain to be slow music in Flagstaff, even if the service is only one of memorial. As a delicious anti-climax Black, after teetering on two wheels for a mile along a shelf from one to two hundred feet above a swiftly running stretch of the Colorado, all but refused to cross an almost placid reach on the rickety ferry. Moreover, when we pulled him back in a skiff the next morning, he confessed to and exhibited considerable nervousness. It was a case of every man to his game, the steel-nerved driver explained from the bank. For himself—why, he never could cotton to nothing with water in it nohow.

It was the two Johnson boys, owners of the Ferry

and managers of the ranch on the Paria, whom Tom had been counting upon to complete his crew. To his considerable consternation he learned, immediately on our arrival, that neither was going to be available. One was away and the remaining brother had been unable to find a man to take charge of the Ferry. Tom, after taking stock of the boats and the huge pile of stores to be transported, pronounced the job the stiffest piece of upriver work ever undertaken on the upper Colorado. "And it's up to you boys to pull it off," he added grimly with a snap of his steel-trap jaw. Plainly the amateur river-rats were going to have a chance to show their quality.

The boats we were to take had been constructed by the Southern California Edison Company for the use of their engineers who had made surveys in Glen Canyon the previous summer. Very solidly built in the first place, the rough bangings against rocks had left the heavy planks of their bottoms considerably shattered. Water poured through in streams on launching and the worst of them required brisk bailing to be kept afloat in pulling upstream to our camp. Twenty-four hours of soaking stopped the worst of the leaks and careful caulking most of the rest. A certain amount of seepage through some of the crushed planks persisted, however, and it was evident that it was going to take a deal of nursing to keep the aspiring flood of the Colorado on the under side of those boulder-battered bottoms until the end of the trip.

The outboard motors were assembled and tried out during the afternoon of the sixteenth. True to form,

my little Elto, clamped to the rail of the Ferry-boat, started and ran like a top at the first turn. No less satisfactory was its trial run on the stern of my still leaking boat. Tiny as it looked in comparison with the other motors, there was still power and to spare in its diminutive cylinders to drive the big skiff at good speed against the four-mile current. I had used an Elto down three thousand miles of the Missouri and Mississippi the previous summer, unclamping it finally in New Orleans in practically as good shape as when I shipped it at Bismarck. But this was running with the current on a light boat, and in rivers with bottoms of sand and mud and offering nothing to bump against harder than snags. Pushing a thousand-pound load in a six-hundred-pound boat against the current of a river flowing in a continuously rock-walled canyon was quite another matter. Also to be reckoned with was the fact that the abrasive action of the grit-charged waters of the Colorado was incomparably more severe than even that of the muddy Missouri. Impossible as it seemed in contemplation, I felt confident that the little motor, barring accidents, was going to prove equal to pushing my boat and load against all but the heaviest sets of current. Whether I would have to rack it to pieces by running continuously wide open to maintain the pace of its heavier and more powerful rivals remained to be seen.

Tom, who had made some use of outboard motors in freighting for another government party in upper Glen Canyon the summer before, was determined to take full advantage of the experience gained on that

occasion in preparing our own motors for the stiff grind ahead. Against the inevitable and continuous bumping of rocks to be expected, he hinged the section of the stern to which the motor clamped, so that the effect of striking an obstruction would be to tilt rather to break it. Having found that no plunger pump would stand the scouring of the Colorado water for more than a few hours, he dispensed with pumps entirely, replacing them with five gallon gasoline cans, set on boxes in the stern, from which water to cool the cylinders could be circulated through rubber tubes. To minimize the scouring of the submerged gears, these were to be opened and greased twice a day, where once a month would have been sufficient for continuous running in clear water. A certain amount of trouble from running hot while the motors were wide open in the rapids would be unavoidable, but this was to be provided against as far as possible by using an excess of cylinder oil. Slight adjustments of the carburetters were made necessary by the fact that we were starting on an altitude of over three thousand feet and would be adding to that somewhat every mile.

Young Johnson came up from the Paria ranch the afternoon of the 16th to help us get the boats ready, and stayed on for supper and a yarn over the camp-fire. Tom had already characterized him to us as the best type of present-day Latter Day Saint: an abstainer from tobacco, liquor and coffee, and a daily reader and follower of the tenets of the Book of Mormon. Tom wasn't quite that good a Mormon himself in spite of having been born a Saint,

but seemed to regret the loss of Johnson almost as much from the angle of a moral example to the rest of us unregenerates as from that of a river boatman.

Born in the log cabin built and occupied by John D. Lee during the years he was a hunted fugitive from justice, Johnson was able to tell us not a little of intimate interest respecting the later history of the sinister perpetrator of what was perhaps the most atrociously cold-blooded massacre the United States has ever known. For Lee, the treacherous murderer of defenceless women and children at Mountain Meadows, Johnson had the severest condemnation and no defence beyond the casual mention of the fact that the victims of the attack came from Missouri, where many Mormons had been shot down in cold blood not long before. He spoke rather of Lee, the almost legendary desert fugitive of two decades—of his life at the little ranch at the mouth of the Paria; of his "four-ways" lookout on the bluff below our camp; of the devoted friends who organized a secret express service to hasten warnings of the coming of the Government agents ever on his track; of his flitting from Indian tribe to Indian tribe, and of how he dropped out of sight for months while domiciled among the Havasupai in the depths of their canyon home; of his ultimate capture and trial, the conviction based almost entirely on Mormon evidence, and the poetic justice of the execution and burial in Mountain Meadows on the very spot from which he had directed the massacre of the emigrants twenty years before. Tom joined Johnson in telling something of the years of persecution to which Lee's numerous surviving

wives and still more numerous children were subjected. Many of the latter were still living, they said, but with their true lineage concealed by every means devisable.[1]

Johnson had been gone for an hour when a hail from the darkness of the opposite bank announced the arrival of a car desiring ferry service. Pulling across to do what we could for them with a skiff, we discovered an auto-load of county office holders from Flagstaff out on an electioneering tour. They had driven the hundred and thirty miles across the Painted Desert to post the local election notices and incidentally, doubtless, to hold the light of truth before the local electorate. Something was said about a meeting—or was it a "rousing rally" they called it? I have always regretted we could not stay over to crowd in upon that conclave and hear the *vox populi* of Lee's Ferry in premonitory rumble. With one of

[1] Much has been written in an endeavour to show that the Mountain Meadows Massacre was directly incited by Brigham Young and the Mormon Church. At this day such a charge seems too absurd for serious consideration, if for no other fact because the Mormons themselves were the ones most deeply injured by it. Bancroft, most fair-minded and careful of historians, makes this point clear in his volume on Utah. "It may as well be understood at the outset," he writes, "that this horrible crime so often and so persistently charged upon the 'Mormon' Church and its leaders, was the crime of an individual, the crime of a fanatic of the worst stamp, one who was a member of the 'Mormon' Church, but of whose intentions the Church knew nothing, and whose bloody acts, the members of the Church, high and low, regard with as much abhorrence as any out of the Church. Indeed, the blow fell upon the brotherhood with threefold force and damage. There was the cruelty of it, which wrung their hearts; and there was the strength it lent their enemies further to malign and molest them. The 'Mormons' denounce the Mountain Meadows Massacre, and every act connected therewith, as earnestly and honestly as any in the outside world. This is abundantly proved and may be accepted as a historical fact."

the Johnsons and the wives of both absent, the number of qualified voters was reduced to four. With one of the latter stricken with peritonitis and two others nursing him, the throng available for that rousing rally was brought down to one—our friend Johnson. He, we learned later, did not turn out to the rally because his conscience would not permit it. The political pilgrims were republicans of "wet" leanings; he a democrat, and "bone dry." I asked Johnson on our return what the rousing rally roused. "Nothing but the echoes from Echo Cliffs," he replied with a grin; adding, with a humour that may not have been entirely unconscious, "and the poor fellow with the bowel trouble died the same night." Of course that is just the kind of complaint that would be aggravated by the maunderings of a county politician.

CHAPTER II

GLENS AND SQUALLS AND CLOUDBURSTS

With all four boats loaded to within a few inches of their gunwales, we were ready to push off at nine o'clock on the morning of the 17th of August. Piled on the bank the stowage of the huge accumulation of provisions, gasoline, camping outfit, life preservers and an endless lot of spares and sundries seemed to present an utterly hopeless problem. The carrying capacity of an eighteen-foot skiff of broad beam is deceptive, however. It took much tentative stevedoring to bring them to a proper trim, but none of the boats was dangerously low for smooth water. There were no rapids worth mentioning to be encountered for the first sixty miles, and by the time we began to breast the somewhat rougher water beyond both provisions and gasoline would be materially reduced.

Short as he was of man power, the assignment of crews was a matter of no little concern to Tom. Whether driven by a motor or by oars, the efficient handling of any boat on a rough-banked, swiftly-moving river requires an extra man to push off into the stream and to jump over and catch the bow in landing. With but six men, most of them green, to four boats, it was inevitable that two units of the flotilla should be manned single-handed. Because my little engine promised to give no starting trouble,

Tom designated me as one of the lone mariners. The choice of the other was between Bill Jones and Lute Ramsaur. Tom made tentative award of the honour to Bill on the score of his more comprehensive experience. He had been a stoker in the Navy during the war, and later the secretary and *zanjero* of a water district in the San Fernando Valley. Lute would claim no more than that he had paddled around a bit after ducks on the sloughs of an Alamitos gun club. As there was no question but that irrigation ditches flowed faster than duck sloughs, Bill seemed to have a distinct edge in the matter of swift-water experience. Tom, as befitted the Commodore of a Flagship that would also have to function as Relief Ship, claimed Bill Ramsaur as Chief Mate and Bo'sun. Lute went to Andy's boat in similar capacity. In Lute's case, as his principal avenue of self-expression was supposed to lead among the pots and pans of the cooking outfit, it was planned to make his river duties as light as possible. Unfortunately (for Lute) that term "possible" had to be given a very elastic interpretation.

Held in leash against the ferry-boat, one after another the four motors came into action. The unmuffled explosions, magnified many-fold as they were thrown back and forth between the towering cliffs, rattled with the ear-splitting staccato of machine-guns. With all the engines hitting sharply and evenly, Tom signalled for our friends to cast off, and out into the current we swung in a very fair imitation of "Line Ahead." That was the first, last and only time the flotilla breasted the flood of the

Colorado in anything even remotely approaching formation, but since we held it round the bend ahead that was all the indubitably deeply impressed populace of Lee's Ferry ever knew about it. They were still speaking of how impressive a departure it was when we returned a month later.

In the deep quiet current flowing for a quarter of a mile above the Ferry everyone had power and to spare; also water. But where a sun-splashed stretch of undulant tawny gold revealed the presence of a slight but unmistakable riffle both of those prime *desiderata* became matters of immediate concern. Tom, steering cannily and with plenty of power in reserve, kept right on going, but the rest of us were quickly in trouble. Jiggering away at my throttle, I took my eyes off the river for an instant and so had the distinction of bumping the first rock. A sickening undulation ran along the sodden bottom as the boat slid over the obstruction, and then the motor, knocked askew on its clamps by a fierce side-swipe from below, uttered an explosive sputter of protest and died outright. The questing noses of two or three more rocks poked playfully into the bottom in the hundred yards or so I floated back while getting the motor started again, but the current was not swift enough to make the situation serious. The motor had been saved from damage by an automatic tilting device which threw it out of the water and dissipated the force of the blow from the big boulder. It started as easily and ran as merrily as ever once I brought it back to position again.

Working back up the riffles, I found two of the

boats laid against the bank with scowling figures bending above their motors. Bill Jones had run aground on a bar and Andy, after going to his assistance, was having trouble getting his own motor again into action. Tending throttle and timer by fumbling touch, I kept both eyes on the channel and pushed on up through the riffle without interfering further with the mosaic of the river bottom. The throttle was all but wide open for the last swirling pitch, but I knew there was still a kick or two in reserve if it was needed. It had been a gruelling test for a motor weighing less than fifty pounds, but on the whole reassuring.

I found Tom lounging on a shady bit of beach and waiting to see if it was going to be necessary to start back on a rescue mission. Presently we heard the cheerful rat-a-tat of a starting motor, quickly followed by that of a second. Side by side the two boats fought their way up through the long riffle, finally heading in past the Flagship for orders. Tom motioned for them to keep going, and hustled me off in their wake. "You boys don't know nothing 'bout the Colorado yet but you'll be learning fast," he said encouragingly. "Mebbe it'll be best if I try running along slow and keeping you all in sight till you get the hang of it."

It was a kindly thought on old Tom's part, and probably quite the best thing to do under the circumstances. The only trouble about carrying it out was that he couldn't get started himself. He was still jack-knifed above the recalcitrant motor when I followed Bill and Andy out of sight beyond a jutting

cliff, and all of the blue haze above him was not from dissolving rings of exploding gasoline. At the end of a half hour's wait the distant rattle of an engine told that Tom was on the road again. Getting our engines started as soon as he hove in sight, the whole flotilla was once more under way. For the next mile, between red walls that constantly reared loftier and more sheer, one boat after another took the lead, but always to relinquish it at the end of a few minutes as a consequence of trying to cut the corner too closely in rounding a bend, or some other little error of judgment that checked or stopped progress for a little while. But bad luck was about equally divided between the four of us, and we kept fairly well bunched until I rammed Bill Jones and killed his engine at a point where he needed all his power to get by. That was pretty near to being a real mess-up.

The trouble was primarily due to the fact that neither boat had more than one pair of eyes and hands available for work and observation which properly demanded a minimum of three or four of each. I had contrived to manage both my tiller lines with one hand, and so had the other available for intermittent soundings with a prodded oar. For bailing my still leaking boat and tinkering with the engine one or both hands had to leave work which, at many points, was not safe to leave. Also, eyes which should never have left off trying to read the riddle of the telltale swirls, had occasionally to be deflected for the direction of one of the other activities. Bill Jones' problems were about the same as mine, but

were further complicated by the constant necessity of keeping filled the big can from which flowed the water to cool his cylinder. Naturally this left him considerably worried, especially as the Colorado continued to uncork more and more idiosyncrasies never dreamed of by the San Fernando irrigation ditch on which Bill had gained his swift-water training.

Bill was guilty of no greater error of judgment in trying to save distance by heading his boat up through the rolling wave thrown off by a half-submerged wedge of red sandstone than was I in trying to follow him. Indeed, the fact that I was pressing so close in his wake when the current got the best of him made the fault of the ensuing collision more mine than his. Even at the last moment the crash could have been avoided had I shut off my motor and allowed the two boats to drift back in open water. A giddy pride in the fact that my little motor seemed to be showing enough power to win through must have been responsible for causing me to try to shoot the boat up between the edge of the jutting rock and Bill's swinging stern. My bow missed both stern and rock, and so had nothing to check the speed with which it banged into Bill's engine. The latter, cocked up on its starboard clamp, hung by a hair, but I managed to keep from pushing it off into the water by shutting down my own motor. Then the whirlpool in the eddy below the rock caught both derelicts and played "ring-around-the-boulders" with them for a minute or two before slapping and putting them to bed under the overhang of a big cliff.

Tom and Andy, chugging along a couple of hun-

dred yards ahead, saw nothing of the precious mix-up and so kept right on going. We two culprits, for a few moments rather inclined to howl for help, gained renewal of courage as soon as it was evident that we were neither swamped nor swamping. Five minutes bailing got rid of the worst of the shipped water and hurried tests revealed nothing wrong with the motors for all of their bumpings. Cheering Bill by assuring him that this was a mere incident in comparison to what happened to Powell and Stanton every day of their Colorado voyages, I proceeded to outline a plan for getting us both out of our difficulties. Since my motor was the easier started, I explained, I would push out into the stream first, get going, and then swing back and take his painter for a tow. That would ease off the water pressure against the propeller and give his engine a better chance to start hitting.

Tilting my engine clear of the water, I sat down to my oars and pushed off. Pulling out of a rock-beset whirpool is not the sort of an operation that one can ever display much smartness and finesse at; even so, I still cannot look back with much pride on the fact that I circled this one five or six times—bumping hard against Bill's boat and each of the encompassing rocks at every circuit—before floundering into clear. Fortunately, I pulled well out into the stream before leaving the oars and turning attention to my engine. Otherwise I would have been on the rocks again in a jiffy. For my hitherto faithful little motor, after a swift opening spin, simply sighed drowsily three or four times and fell fast

asleep. I had spun a wheel above dormant cylinders for five minutes, drifting meanwhile four or five hundred yards downstream, before I located the seat of trouble in the empty tank, unreplenished since the trial runs of the day before.

Refilling on the bank of a convenient eddy, I started back to recover the lost distance and incidentally my marooned comrade. Bill had gamely tried to sally to my rescue, but had accomplished nothing much more tangible than the tracing of queer cuneiform characters on the encircling rocks with the propeller of his tilted motor. Winged to my ears somewhat indistinctly above the roar of my engine, I thought at first his words had to do with a spirited translation of the cryptic characters his erratic spinnings had engraved upon the sandstone. Throttling down as I signalled for a line, I found that he was simply telling the whirlpool what he thought of it, and in language neither cryptic nor polite.

About the only thing needed for the proper rounding out of that little episode was the entangling of Bill's painter in the fly-wheel of my motor—and I did it. Being towed is a real help in starting a cranky outboard motor, but it is only practicable when there is an extra man in the leading boat to look after the line. I caught Bill's flung painter smartly enough, but when four or five pressing navigational duties developed at the same instant I cannot censure myself over-severely (in retrospect at least) for not preventing the frayed end from fouling the spinning wheel. Bill's boat was whisked out of the whirlpool and wound in like a taffrail log, but by great

good luck the motor stalled down and died before the painter was all reeled up. Missing by a hair being drawn back into the swirl, the two boats, swung side-to-side, floated with the current across to a bar on the opposite bank of the river and came to rest. Disentangling the painter, I held the nose of Bill's boat until his engine was started and pushed him off again into the current. Passing the riffle by working up the quiet water on the bar side, we rounded the bend to meet the Flagship, barging down stream with the current at full speed, coming to look for us. Pantomiming "engine trouble" in response to Tom's interrogatively lifted palm, we held on our courses. There was some consolation in the fact that the shameful performance had not unfolded under the critical eye of the Commodore.

Running with only minor mishaps for the rest of the morning, we landed for lunch on a talus of great sandstone boulders in the shade of an overhanging cliff. It was not until Tom tried to describe for me a point not far back as the site of the great Lee's Ferry Dam that I realized how very little of the Canyon I had seen—with an eye, that is, to fix any image in my memory. Beyond a vague impression that the walls had been getting higher and more abrupt as we proceeded, the sum total of my mental pictures had to do with a corridor occupied at one end by a spinning fly-wheel and at the other by the 'V' of the bow silhouetted against a red-brown sheet of rolling water. The place where Bill and I had collided and floundered about for half an hour in an eddy was pictured in my mind as no more than a half-

closed well, occupied by a whirlpool full of rocks and opening on one side to a fast-running riffle. This was due to no lack of interest on my part in the scenery of one of the most strikingly beautiful stretches of the Colorado, but only to the fact that my mind had been so occupied by the over-lapping duties of navigating an undermanned boat that it had failed to register extraneous impressions. This, I may add, continued to be the case to the end of the up-river voyage. Almost the only places which I recall clearly are those where a halt was made, and of these there is the most detail in the vistas that opened up from where we lounged lazily among the rocks in the half hour after lunch. Camps were too often made after dusk, and broken in a hectic rush the next morning, to leave much impression of their scenic features. Of the natural charms of that striking reach five miles above Lee's Ferry that is rated as possibly the most favourable of all Colorado River dam-sites, I have no recollections whatever beyond those gained when we halted there on the downward voyage.

Glen Canyon is the Grand Canyon on a slightly reduced scale; but what it lacks in sheer magnitude it makes up in the added charms of its gentler natural beauties. Although its walls are neither less sheer nor less lofty than the average run of those of the Inner Gorge of the greater chasm, the less torrential current of the river—due to a slighter declivity—in Glen Canyon has permitted the formation of more frequent and more fertile stretches of wooded bank and bench. One is never out of sight of trees,

nor often of flowers. Very rare are the reaches where there is not a fringe of willows at the foot of one wall or the other. But the crowning glory of Glen Canyon is in the bower-like amphitheatres of verdure that were responsible for its name. These are primarily due to the seepage of water down through the porous sandstone to drip in sparkling showers from the over-hangs and bubble in clear springs from the base of the cliffs. The loftier bowers—some a thousand feet above the river, close under the canyon rim—form an almost unbroken chain of hanging gardens throughout the hundred and fifty miles from the mouth of Fremont River to the head of Marble Canyon. As far as the glass reveals, their verdant brightness is that of trailing fern. The riverside bowers are larger but less frequent. They are veritable tropical jungles of oaks, berry bushes and blossoming flowers. And deep back under the cliff behind the masking verdure is always to be found a pool of clear, cold water. No more enchanting retreat from the blistering noonday heat of the river could have been designed by a Titania. Many a sun-scorched brow and riffle-ruffled temper did we cool in the lucent depths of these bowers of Glen Canyon.

With replenished tanks and freshly greased gears we shoved off after lunch to meet a very purposeful set of current that came swaggering down walls that sprang sheer from the water on either side. At one considerable stretch where there was no place to wade and tow in the event of engine failure, we faced our first real test. Tom seemed to get by with a shade to

spare. Andy was harder put, but won through with the very material help of Lute at the oars. With me it was touch and go for a few minutes. Wide open and speeded up to the last notch, taking advantage of every little swirl and eddy where the base of the cliff checked the sweep of the current, my progress for the worst hundred feet was literally inch by inch. My motor was lost in steam-clouds as I came out to the easier water, and Tom greeted me with an "I told you so" grin where he was waiting against the bank.

"Mebbe you'll believe now what I tell you about what the Colorado does to plunger pumps," he remarked grimly, flicking water on my sizzling cylinders. "That new one of yours is all in at the end of four hours' running. Can't do nothing for it now. Nurse her along for another hour or two if you can. We'll make camp early if we have to and you can rig up a can like the rest of us. Work her on easy. Give you a tow if you need it."

That last was grunted as Tom gave the first twirl to the wheel of his own motor. After five minutes' cooling my scoured pump threw a fairly good stream again, and there was just a slight touch of balm in going popping merrily off upstream and leaving Tom and his bucking engine still spitting compliments back and forth at each other. With easy water things went on fairly well for the next two or three miles. Andy and Lute were out a long way ahead for a while. Then something went wrong with their engine and both Bill and I passed them where they hung disconsolately to a bunch of willows. Bill increased his lead while I stopped to cool my pump,

and finally old Tom barged by with the Flagship, jauntily offering a tow-line.

A wide shallow riffle where the river took a long sweep to the north marked my head of navigation with engine for the day. Tom and Bill went up rather smartly, but common sense should have told that my fading pump would not be equal to the strain. Halfway up the overheated engine stalled and stopped, unfortunately, just above the only visible boulder in the whole riffle. Of course I swung back and lodged squarely across it, and of course my upstream gunwale hove down and intercepted an eighteen-feet-wide swath of the flood of the Colorado. The boulder kept the boat from filling and sinking, but there was little more than an inch of freeboard when I finally shoved clear and started paddling for the bar. It had drifted down below the foot of the riffle before I was able to make a landing.

Andy and Lute hove in sight by the time I had finished bailing, but in trying to stand by and pass me a tow-line their propeller smashed into the gravel and stopped the engine, apparently for the day. Rigging bow and stern lines to control the course of the boat, I set off towing up the bar. With properly adjusted lines, and under favourable conditions, it is possible to steer a boat almost where one pleases in this way. Slacking the bow-line and taking in the stern causes the current to drive the boat away from the bank. The opposite procedure brings it in. Even a single man may exert his strength to good effect in towing by this method, but only when he has a stream fairly deep and clear of rocks and a good

bank to walk on. On this occasion it failed on account of the shallowing of the bar along the riffle. I overcame that by taking hold of the bow and wading, but it was punishing work with the heavy boat among the slippery boulders. With a slower current and only sand underfoot, it was easier going above the riffle, that is, until all going on the hoof eased abruptly where the bottom dipped sharply at the foot of a sheer red wall.

The pump spat nothing but steam when I started the engine again, so I only kept it running long enough to cross to the opposite bar. Resuming my wading in quieter water, I doubled a long spit of sand at the end of a quarter of a mile, to be greeted with the welcome sight of a blue curl of camp-fire smoke at the head of the next bend. Continuing on up the same side until I was a hundred yards above the eddy where Tom had tied up the boats, I pulled across and moored alongside the Flagship. Tom was already out of sight, scouting on foot down the right bank for the missing boat. The shadows of night were thick along the river bottom before the flotilla was made complete by the arrival of three very weary men plodding through the soft sand at the end of a tow-line. And that was the first day!

Our camp that night was pitched on the hump of a clean, white, newly uncovered sandbar. A bar lacks a good deal of being the most favourable character of camp-site offered by Glen Canyon; at the same time it is far from the worst. The ideal, indeed quite the idyllic, site is one of the bower-like glens, with its protection from the wind and rain, its clear

water, and its soft natural couches of bracken and maidenhair. With some leeway in the matter of the movable feast of our noonday stop, it was usually practicable to dock at one of these Titania rest-houses for lunch. Pushing hard to take advantage of the last of the daylight on the river, making one for the night camp was entirely a matter of luck. Failing a glen or the mouth of a clear stream, a dry sandbar was usually preferable to grading off a terrace among the willows of the steeply sloping bank. In favour of the bar was its comparative freedom from snakes, scorpions and centipedes, the hard, firm landing it provided and the fact that it was always approximately level. Against it was its lack of shelter, the shiftiness of the sand and the fact that it was always in danger of inundation in the event of a sudden rise. At one or another of our sandbar camps we experienced diversions due to each of these causes. That of the first night had to do with wind and the unstable-mindedness of sand.

Later, when we became more sapient of Glen Canyon meteorology, we learned to expect and to prepare for the gusty twilight wind squalls that seemed invariably to follow a clear, hot day. These appeared to be caused by the highly heated air-columns between the Canyon walls rising to get above the more rapidly cooled air strata of the open plateaus. It was always a good deal of an atmospheric rough-and-tumble while it lasted, with the inoffensive bystander usually coming in for all the worst of it. Directly the sun had ceased to strike the higher levels, the fast chilling atmosphere would come tumbling

down over the rims in great fresh cataracts of coolness that set going a veritable aerial maelstrom in the hot pool of the Canyon. Coiling air columns danced like dervishes over bar and bench, flinging on high all that was loose, spraying with a blast of air and sand all that was fixed. In from twenty minutes to half an hour atmospheric equilibrium was restored, and a cooled and freshened Canyon grew quiet for the night.

As we learned better how to pick our sandbar camp-sites with the river, a rock or a patch of willows to windward, this twilight changing of the aerial guard came to trouble us less and less. That hastily pitched camp of the first night, however, was in the heart of a waste of loose sand, so that the dancing dervishes, swooping down from the cliffs that walled three sides of the bend, met, mingled and mangled directly over Tom's nascent driftwood fire. The fire, except for the few heavier brands that found lodgment among the unrolled bedding, dissolved heavenward in a shower of spinning sparks. The half-cooked supper might have gone farther but could hardly have fared worse. Just how badly it fared may be judged from the fact that the optimistic Lute first hailed a sticky, sand-hot handful he had salvaged from the lee of a log as his missing ham-and-eggs, and then—after biting into it—had to change his verdict to "canned pineapple and a fragment of shoe-sole."

Stamping out the scattered firebrands, we suppered on crackers and bully beef, shook the sand from our blankets and turned in. Tom's ax, cracking up the

wood for the breakfast fire, was the only other thing to disturb my rest that night. He claimed that it was four o'clock the next morning, and showed a watch to prove it. I knew better, but somehow couldn't present my arguments effectively, especially when I found all the others had been deluded into getting up and, if somewhat languidly, even packing up. And Tom proved to be right after all. The lemon-primrose flush of the false dawn was flickering above the rim before we were through breakfast, and by the time the flotilla was ready to push off there was almost light enough to see by. That the rosy glow of the coming day had not cast its light-plummets into the depths in time to prevent the pulping of a thumb while hammering on my new water can was a matter of secondary importance—all in the night's work, so to speak.

We ran in good luck all morning, and must have put over six miles of winding canyon behind us before tying up for lunch in the deep pool of clear water at the Wa-weap. Standing squarely across the mouth of the creek and forcing it sharply to the right in finding a channel to the river, is Sentinel Rock, one of the most distinctive and striking landmarks to be found anywhere on the Colorado. It consists of a slender pillar of red sandstone, scarcely thicker at its base than at its pinnacle, two hundred feet above. It had once stood as the apex of the main cliff, and has probably been reduced to its present graceful proportions as a consequence of continual encroachments upon its base by both the stream and the main river. So precarious appears the position of this

sliver of obelisk athwart the course of the sometimes torrential Wa-weap, that one wonders how it can possibly survive the next spring flood, or even the run-off of the next cloudburst on the plateau above. Doubtless Powell thought the same thing; yet the photograph taken on his second expedition of fifty years ago shows a profile of the lone sentinel apparently quite identical to that in my view of last summer. It was Powell, by the way, who gave this striking monument its singularly appropriate name. He also applied the name of Sentinel to the creek whose mouth it guards, but somehow the picturesque Indian designation seems to have refused to be dislodged.

We were speculating upon the possible effects a cloudburst-wave rushing down Wa-weap would have on Sentinel Rock when, by a somewhat remarkable coincidence, a rumble of sudden thunder and the flare of hidden lightnings signalled the advance of an unseen storm of considerable force. Tumbling over one another like scuffling bear cubs, the black, water-swollen thunderheads came rolling up the gorge, blotting out the light of the sun-bright ribbon of the rim-framed sky. The gay golden noonday glow of the canyon faded to a ghastly green; then dulled through a dusky olive to a sinister, sentient purple.

Muttering something about the mouth of a creek being the last place a guy wanted to be with a cloudburst busting, Tom began casting an anxious eye about for a place of refuge. There was a big cave half a mile upstream, he said, that was safe against anything short of the Crack o' Doom, but it would

hardly do to risk the boats on the open river till the storm was past. A tepee-like niche where a broad slab of sandstone leaned against the base of Sentinel Rock appeared the best solution of the difficulty, and Tom ordered a rendezvous there after the boats had been removed to a place of greater safety.

Bill Jones, as direct of action as of mind, started to wade straight across, leading his boat by the painter. Down to his eyes at the first step in the soft silt deposited by the Wa-weap where it was dammed back by the flood of the Colorado, he swam the rest of the way, but even then had a hard flounder before getting anything solid underfoot. The rest of us, profiting by his example, pulled out into the main stream and worked up along the eddy to the base of Sentinel Rock. Mooring the boats as securely as possible, we clambered up to the protection of the leaning slab. Turning to peer at the storm, we discovered to our not inconsiderable relief that it had left the gorge at the bend below and was breaking with savage force upon the crest of the plateau.

Just which mound or pinnacle of the heights above had rasped the bottom off those murky clouds and released their accumulated floods we could never be certain. A roaring and grinding that was not from wind or thunder told that a cataclysm was taking place somewhere up there, but all we saw of water was a half dozen tremulous jets that played from the rim for a few minutes, to cease as suddenly as they had begun. Doubtless they represented no more than the spray of the outer splash of the main dump. At both Glen and the Grand Canyon drainage is

away from the rims. The flood from this particular cloudburst must have found its circuitous way back to the Colorado by the side canyon draining whichever of the tributary watersheds the deluge invaded. We were not anxious to linger to find out if any of it was coming down the Wa-weap. But the end of our experiences with cloudbursts was not yet.

With another bank of storm clouds blowing up from the south, Tom decided to run along to the big cave and camp within reach of shelter. One sharp squall broke while we were working up the river. The two leading boats were in for something of a drenching, but Andy and I, by running under a long overhang of cliff, came through almost dry-backed. Busy as I was steering between the Scylla of the rain and the Charybdis of the cliff, I still could not quite miss the Aladdin's Cave effect lent to the innermost depths of the overhang by clustering knuckles of water-polished garnets. I also hailed in passing a number of bright little lizards, temporarily driven by the rain from their favourite outdoor sport of catching flies on the sun-warmed cliff at the water-line. With the lowest sheltering crack a thousand feet or more above, one could judge of their love of the game by the length of that desperate upward and downward crawl. I have known golfers to grumble over having to climb a long flight of club-house steps. I became more and more intrigued by these game little sportsmen as the days went by. When changes transpired that left me with more time on my hands, I began keeping a pair of them as pets, coursing

them for imitation flies (dried currants) on a smooth section of flour-sack.

With the half dozen ducks that had fallen to Lute's gun in the course of the morning, and plenty of time for cooking with frills, supper was a very different affair from that of the previous evening on the wind-scoured bar. The storms passed over early, leaving the air fresh and cool, and so in no need of equalization from above through the medium of the twilight dervish dance of warring winds. The great arching cave, running back fifty feet or more into the cliff, was dry as a bone, but its pavement of bat guano had a musty smell and a verminous look. The Ramsaurs and I plumped for risking the rain by sleeping on the beach; Tom, Andy and Bill Jones shouldered their beds and toiled up through the brush to the cave.

Although the mouth of the cave was a couple of hundred feet from where we were turned in by the river, the smooth upcurving arch of it made so perfect a sounding board that even the heavy breathing of the would-be sleepers was audible to us as they set up their cots and spread their beds. For a while they conducted a lively expulsory campaign against bats and rats, employing both bed-bundle straps and word of mouth. We caught the swish of the straps and the short, chesty grunts that followed the blows upon the empty air. After a while they settled down a bit, and Tom told what he said was a funny story about a tramp who, seeing a trunk in front of a second-hand store tagged "This Size for

Ten Dollars," promptly remarked, "So do I!" After a somewhat charged interval of vocal silence punctuated by the swish of straps and the whir of wings, the raconteur said he would tell them another story that would make it easier for them to get the admittedly elusive point of the first. This had to do with the lady owner of a vicious terrier who, on being asked "How's your dog?" replied, "I have." Still no answering guffaws. Even Tom's meticulously diagramed mental graph of each story only drew from Andy the snorting comment that they reminded him of the gasoline we had brought from Flagstaff.

"I suppose you mean because they're hard to start at this altitude," Tom suggested gropingly.

"No," answered his son; "only because they're so far fetched."

The long-delayed gust of laughter swooped down from the cave following that sally, but I could not detect Tom's chesty bass contributing to its volume. More likely he was the inspiration of the thud that had the sodden sound of a wet shoe striking a soft surface. A number of things seemed to be flying through the air after that, but sleep supervened before I could make out whether or not they were borne on whirring wings.

And the boom of an ax on a hollow log was the morning of the next day.

The general average of our navigation was improving steadily with experience. Collisions with rocks and groundings on bars were less frequent than at first, and delayed us less when they did occur. We

were also acquiring the technique of working up through the eddies more effectively, making the most of slack water and picking the best courses through the swift. This, and the lightening boats, about offset the slow but steady quickening of the current that we knew was to be expected all the way to Hall's Crossing, our destination. The starting troubles of the large motors were still frequent and annoying, but in spite of these—and barring a breakdown of the engines or the smashing of some of the boats—there seemed a good prospect of averaging the ten miles a day that would take us to our upstream goal with a good margin of time to spare.

My little Elto, after the addition of the water-can gravity cooling system, ran like a top. Where towing round was practicable, I spared it at the hardest riffles, and it showed its appreciation by responding with an unguessed reserve of power when there was no alternative but to drive through. The steady replenishment of the water-can by dipping from the river added another duty to the five or six I was already trying to perform with two hands. But dexterity improved with practice, and I soon developed a sort of "touch" system of steering, sounding, ladling and jiggering with the motor which, operating with less and less ocular supervision, left my eyes comparatively free to size up the river and pick the best courses. Wherever it was practicable, Bill Jones and I found our navigational difficulties considerably simplified by following closely in the wake of Tom or Andy. Both father and son displayed good judgment in picking channels, being helped not

a little by the division of duties made possible through the presence of an extra man in their boats. That extra man, pulling at the oars, made it possible for them to go up through many a riffle where we lone navigators had to shoot across to the bar and wade; but there was no tendency to run away from us on that account. On the contrary, indeed, both of the better-manned boats were constantly on the watch to lend a hand, and neither ever allowed more than a bend or two to intervene between itself and the rearmost of the laggards. Bill's troubles were a good deal worse than mine on the score of falling behind. The perfect starting and consistent running of my little motor rather more than made up for the fact that it had somewhat less power than any of the other three. Plugging steadily along, it is probable that, first and last, I was waited for a good deal less than I waited.

It was during the third day that the tips of occasional soaring spires and pinnacles began to show above rims that had hitherto formed our only skylines. It was not that the canyon walls were becoming any lower, but only that we were penetrating to a region where they were backed by a second line of cliffs similar to those which tower above the inner gorge of the Grand Canyon. The difference between the two great canyons is largely one of dimension, and of that one could not come to a complete realization unless the lesser gorge were to be picked up bodily and deposited in the former. Without a scale of comparison one is hardly conscious of any great disparity in size. Glen Canyon, to be sure,

never gave me anything quite on a par with that staggered, all-gone-inside sensation that even a Chicago pork-packer must feel at a first glimpse of the Grand Canyon from El Tovar, but that would have been largely due to the fact that I never had a chance to view it from so favourable a vantage. Neither in the course of our up- or down-river voyage was there time to climb any of the loftier outer cliffs and headlands. The highest of the rims to which we did ascend were not much over a thousand feet above the river, where at El Tovar one is at a height of a mile or more above the bottom of the inner gorge. Confining the comparison to the "worm's eye" views to which the boatman is limited, I can recall no pictures of the Grand Canyon opening up from the river at the foot of the Bright Angel or Hermit trails, or at the mouth of Diamond Creek, that surpass in my mind scenes unfolded to us many times daily along the middle reaches of Glen Canyon.

An advancing phalanx of thunderclouds that came rolling up from the southwest while we were at lunch on the third day of the voyage proved to be the curtain of one of the most stupendous natural dramas I have ever had the fortune to witness. Except in the one case in ten thousand that this one proved to be, people seeing cloudbursts have always been either too near to, or too far from, the centre of action to be able to gain any connected impression of how the thing really works. Usually, as in our case the previous day, spectators are at so distant, or so unfavourably located, a vantage point that they see

no more than a great big, black lightning-riven rain cloud. Indeed, the impression of a big, angry rain cloud is about all one can get unless he is in the very heart of the deluge. In that case, in the unlikely event he survives, his recollections are not likely to prove much more voluminous than those of a man who has been sandbagged in the dark. Even on the edge of a cloudburst, where the water is falling only in broken sheets rather than in solid masses (and this experience I have touched somewhat intimately), there is not much more to be seen than in a shower-bath. Really to see how the wheels of a cloudburst go round, the observer must have a comparatively safe point of observation and a completely unobstructed range of vision. Also, he must be far enough away to grasp the ensemble of action, but still not so far that he misses the details. Such a combination might well refuse to click into realization in the whole lifetime of even a dweller in cloudburst lands. And yet here was Jupiter Pluvius, advancing arm-in-arm with Thor of the Thunders at the head of their billowing cloudland retinue, bringing it to a bedraggled bunch of voyageurs almost on a silver platter.

For one did not need to be overly weatherwise, nor unduly sapient in the ways of Thor with a black cloud full of water, to know that the oncoming storm was just as certain to miss the bend where we waited as it was to hit a great jagged pink and terra-cotta butte that towered three or four thousand feet in the air a half mile up the opposite side of the river. To make assurance doubly sure on the score of our own

safety, the heavy overhang of the cliff in whose shadow we lounged offered secure retreat in the unlikely event of the storm's flying off on a tangent when it collided with the obstructing butte. We had the best seats in the house for the show of a lifetime. The curtain was up and there was nothing to do but munch raisins and wait for the climax.

The drama developed without hitch—not a cue was missed. Even the sun, obscured at first by a maverick flight of frosty cirrus, turned on a golden sheaf of spotlights for the climacteric scene. With the sun shining, the ghastly greens and olives that had banked the gorge to the rims during the storm of the day before were confined to the wavering column above the jagged cloud-shadow racing across the opposite plateau.

"That sagging-bellied cloud," I began largely in an attempt to be impressive, "reminds me of a bombed Zeppelin I once saw trying to drag its punctured gas-bag home across the North Sea. I was in a destroyer out from Harwich—"

"Zeppelin, your hat!" snorted Tom, in flagrant disregard of the fact that my only piece of headgear had gone into the river an hour previously; "nothing so soft as a gas-bag 'bout that devil. He's carrying a million tons of water stowed under his belt. Looks to me more like a raging black bull."

Andy, pointing out politely that bulls didn't wear belts, and, moreover, couldn't stow a million tons of water under them if they did, suggested a dirigible reservoir as the proper object of comparison. Lute, more romantically inclined, feigned to see the flash

of bayonets in the forked lightning, and pictured charging soldiers. Bill Jones, always a shade less elegant than the rest of us, saw a big fat mother-pig rushing to the morning trough, and encouraged her with explosive grunts of "Suey! Suey! Suey!"

Technically, beyond doubt, Andy's "dirigible reservoir" was the best descriptive term; yet it still seems to me the simile of the punctured gas-bag conveys to the imagination the most graphic picture of the look of things at the climax. Nothing could have been more suggestive of a wounded balloon than the way that sinister low-sagging cloud bumped along the top of the plateau. Dusky streamers of rain, trailing far astern like drag-ropes, told that the blows from the smooth round knobs of sandstone had set the inner envelope leaking without holing it. One sensed an almost rubbery toughness in the bounding water-bag, and felt that it was equal to withstanding those soft bludgeony bumps indefinitely. It was going to take something jagged-edged or sharp-pointed really to rip a proper gash in a fabric of that character. That rough-necked, red-headed Titan of a butte was just the sort of thing for it; and exactly in the right place, too. With that obstruction out of the way there is no doubt that the cloud would have survived to stagger on a mile or two farther, and so burst quite out of sight of the bend from which we watched.

The blue-black shadows of the racing cloud clapped down over the high-flung pinnacle of the butte like the death-cap over the head of a mediæval executioner; and what followed maintained the simile.

It was doubtless the sudden crash of thunder and spatter of lightning that created the illusion of a solid impact when the flying ball of nimbus impaled itself upon the jaggéd fang of rock. Ripped from end to end, the great water-bag spewed forth its imprisoned flood and dissolved in streaming rags and tatters of thinning vapour. It was not simply a terrific rain that was released; the earthward flying mass of water was as solid and as ponderable as the flood from an opened head-gate.

The supreme wonder of the spectacle came with the crashing of the waters upon the rocky base of the butte, a thousand feet or more below. Only fluttering gleams, as evanescent as the lightning but less brilliant, revealed the cataclysmic discharge while it was still in the air; but where it dashed upon the rock it was as though hundreds of yards of the plateau along the lower slopes of the butte had been changed at the wave of a wand to the boiling pool at the foot of a heaven-high cataract. One instant we were looking at a gypsum-streaked slope of gay red rock; the next at a seething, snow-white welter of water that rebounded high into the air and dissolved in sunshot spray. Spreading fingers of drainage fanned out to the left and right, and three or four of them ran to feed sudden, short-lived falls from the rim to the river, such as we had seen the day before. The duration of the flood of solid water could not have been more than a minute or two, though tumbling cascades from the higher levels, half veiled in a rising cloud of rainbowed mist, continued to run for much longer.

The earth-shaking crash of the descending floods was in itself a thing to make a man gasp and hold his breath. It came to our ears in a great savage wave of sound perhaps two or three seconds after our eyes told us that masses of solid water were being precipitated upon the butte. While it lasted the roll of the thunder shrunk to the rat-a-tat of a boy's snare-drum and the native rock upon which we sat shivered as in the grip of an earthquake. The sound—in its raucousness, its rawness—was more that of an imminent avalanche of great volume than of a waterfall. At Niagara, Kaiteur, Yguazu, even at the Victoria Falls of the Zambesi, one is conscious that the resonant roar he hears is that of water falling upon water. Here one knew that his ear-drum was being torn by the aerial vibrations resulting from solid water rending solid rock.

I was aware from time to time of awe-gaping jaws being gathered up as a preliminary to outward expression of inward sensation. One of them was my own. But whatever of pearls were broadcast were doomed to waste their sheen upon the desert air. I think the loss was not great. Men usually curse fervently when greatly stirred, either to awe or to anger; or else perpetrate cheap witticisms to hide their real feelings. They are always ashamed of these jokes if they remember them later, or at least they should be. Take mine, which had to do with the storm-cloud committing *harakiri* on the pinnacle of the butte. Tom shook his head blankly when I tried that on him at the climacteric moment, for of course he couldn't hear it. At supper, a few days later, I

tried it again, unfortunately, perhaps, just after I had been dissertating in somewhat highbrow vein on the movements of cirri and nimbi and cumuli. Tom mouthed *harakiri* rather disgustedly once or twice, then shook his head impatiently. "Them storm clouds all look alike to me," he growled; "but it ain't as if I was one of them that didn't know enough to go in when it rains." As I had been taking advantage of a shower that afternoon to scour a little Colorado silt out of my hide, that closing remark was not without its point. But Tom and I never did think much of each other's jokes.

So considerable a meteorological disturbance as that which we had just witnessed could hardly take place without leaving a few stray odds and ends of high and low pressure tumbling about in its immediate wake. Reckoning that these were just as likely to take a form calculated to help as to hinder upstream navigation, Tom ordered the flotilla to get under way. Bill Jones and I, pushing off in advance of the other two boats, ran out to midstream just in time to connect with a fine spanking little southerly squall that might well have been hurrying up river to see what had become of the pieces of the parent cloudburst. Tom and Andy missed the very substantial lift that timely series of gusts gave us, but received the full benefit of a side-winding squall that came boring down over the rim of the bend we had just left. Perhaps benefit is hardly the word to use, for that vicious little twister, catching both of their boats side-on before they could be headed to meet it, drove them straight over against the sheer

cliff of the right side of the river. Jammed together and clamped up against the sandstone wall like a couple of half-dislodged limpets, the last glimpse I had before a sheet of blown water cut off the view revealed considerable activity with both fly-wheels and bailing cans.

Bill and I only got a splash from the tail of that little trouble-maker, but a real worry developed when it became apparent that our first upstream squall had met and was waging unequal battle with a downstream squall of considerably greater might. Locked in a death-grapple, they were fighting it out to a finish all over the channel of a narrow neck of canyon immediately ahead. With sheer or overhanging walls on either side, and so no place to land, there was nothing to do but keep on going and make the best of it.

With the whirlwind (for that was the form the Borean ruction took) seeming inclined to move down the left side of the river, the obvious course to take to avoid it was close in against the cliff to the right. It looked like fairly good going there, and such it would have been had not an air-pocket at that particular point—doubtless created by the rough-and-tumble going on across the river—demanded instant replenishment from above. As a matter of fact, air was probably moving into that Swiss cheese vacuum from several directions. The installment from the plateau I remember particularly because it brought with it an infernally persistent cataract of blow-sand, fine, sharp blinding particles that gravitated to the eyes like iron to the magnet.

It is only to be expected that the finer intricacies of navigational finesse should be considerably blunted under conditions like those. Of course Bill rammed me, and of course I rammed Bill, and of course both of us rammed and re-rammed the cliff. Strangely enough, none of these little tentative rammings seemed to do very much harm to anything or anybody. But where the fur and feathers really began to fly was when we caromed off the cliff and went over and rammed that baby cyclone. The only thing comparable in my experience to that sudden twisting jolt of impact was toddling into the side of a spinning merry-go-round when I was four. The one nice thing in connection with the sequel was having the sand washed from my eyes by the flying spray, and that, with the air stiff with blown water, didn't widen greatly my range of vision.

There was a rather confusing play of warring forces around the base of that spitting column of whirling air. The wind action appeared to be exerted centrifugally—throwing outward; that of the sympathetically whirling water acted centripetally—drawing inward. Trying to go both ways at once the boats, naturally, did some little spinning themselves, and not always on even keels. I am inclined to think that the expulsive action of the air was the stronger force: that my boat would have been thrown quite clear after the first impact if only there had been an open course for it. But every time it started to shoot away from the vortex Bill's boat would drive out of the spray and jam right across its bows. Bill said later that my boat kept blocking the escape of his

in a precisely similar manner. So, impartially cussing the air, water, sand, each other and the universe generally, Bill and I, fighting-cock like, banged in and out in erratic circles for all of a long half minute. At the rate we were taking water, probably another half minute would have swamped us both. Before that happened, however, the twister—more out of boredom than pity, doubtless—spun off downstream in search of a quarry less cringing and more worthy of its strength. It was roaring and sharpening its teeth on a sandstone ledge at the next bend the last we saw of it, possibly in preparation for gulping down the other boats, Bill suggested.

It was a rather remarkable fact that not all of the water and sand with which they had been deluged sufficed to stop either motor. Popping somewhat erratically, but still with a goodly amount of kick behind them, they pushed us up to a landing on a hard bar where the right-hand cliff edged back a few yards from the river. Here, bailing, cleaning up and snugging down, we waited for the other boats to come out from what Bill facetiously called "The Valley of the Shadow of Bluffs."

CHAPTER III

CROSSING-OF-THE-FATHERS TO AZTEC CREEK

It was a quarter of an hour before Tom and Andy hove in sight with their respective commands. Considerably banged about by that first squall, they had discreetly worked along to a sheltered crack in the cliff and let the rest of the whirls go by. The air was still a bit nervous and jumpy as the reunited flotilla pushed on up river, with occasional sharp flurries of rain playing hide-and-seek with sunshine and shadow. These were no more than dwindling fragments of the shattered storm, however, and quite empty of real menace.

There was quiet, smooth water for a mile, and the four boats ran well bunched until a broadening river opened out to a long straight reach crossed with baffling shallows. The adventurous Bill Jones built up a substantial lead by taking a chance at precarious short-cuts through obstructing bars, which made it rather the worse for him when one of them finally ended in a *cul de sac* a good two hundred yards from the only practicable channel. Trying to reach deeper water as the crow flies rather than by working back through the sinuous passage along which he had come, he ended by getting into a maze from which there was no apparent outlet at all. In an endeavour to re-

duce temporarily the draught of his boat, Bill started discharging cargo at this juncture.

Setting up a foundation of two cases of gasoline, he erected a six-feet-high pillar of blankets, duffle bags, grub boxes and cooking utensils, topped off with a sack of sugar. As he was about to push over the bar with the lightened boat, Bill looked back over his shoulder to discover that the settling of the gasoline-case foundation into the quicksands had converted his pillar of food into a recognizable imitation of the Leaning Tower of Pisa. Quick intervention prevented it from becoming a falling tower, but only at the cost of allowing the boat to drift before the wind into a quickening current. Being only an irrigation-ditch sailor, Bill evidently reckoned that sticking to the grub was more important than sticking to the ship. At any rate, it was by a half-foundered grub-pile that we found him—after mourning him as drowned through the long forty minutes that it took to tow back the empty boat that came bobbing to meet us half a mile below.

Nobody (save possibly the resilient victim himself) laughed louder than I did over the funny modified Maypole toddle Bill was dancing in endeavouring to bolster all four sides of his sinking grub-pile at once. And doubtless none would have laughed longer—save for a bit of a contretemps that befell an hour later to recall to my unchastened spirit how very easy it is for a skipper of even more than irrigation-ditch training to be pried loose from his command. More fortunate than Bill, I was able to work out my own salvation, and so to present my own version of how

I came to be decorating a midstream bar with a half-filled boat and much wet bedding. I forget just what I did tell that grinning bunch of pirates by way of alibi, but this is just what *did* happen:

Piling up a quarter of a mile lead on the nearest of the other boats, I took the occasion to run in alongside a big slide of sandstone slabs to refill my tank. Miscalculating the speed of the current and shutting off my engine too soon, the boat stopped short by a few feet of the eddy I aimed for and started to drift back downstream. In trying to loop the bight of the painter over a projecting corner of rock, the boat was heeled so heavily as to dump not only my own floundering anatomy into the water but also two loosely stowed bags. In a trice boat, bags and man were drawn into the grip of a strong-setting current and bumped with cheerful impartiality down along the jagged edge of the rocky talus. The boat was the only one of the quartette that was not up-ended once or twice, but even so it was scooping in water fast enough to reduce its already scanty freeboard to that of a floating log.

Trying to chivvy the two bags together preparatory to chucking them back into the boat, I lost my hold on the painter and with it all control of my late command. That was the reason why the boat took one channel and the bags and I another when we came to the head of a gravel bar below the slide. Favoured by deeper and swifter water, the boat increased its lead rapidly. By the time I, with a dripping bag in either hand, stumbled out through the shallows to the uncovered hump of the bar, the skiff had been

carried across to the left side and was starting a new game of "bump-the-bumps" down the cliff. Luckily the hundred-yards-long strip of gravel was disposed like a chord across the arc of the bend round which the boat was being banged, so that a hard sprint to the foot of the bar gave me enough lead to wade out and intercept the sodden and all-but-foundered truant in time to prevent its staggering across against the right-hand cliff for what must have been the final round. There was real luck in saving the boat from an upset and a possible battering to pieces, just as there was real sorrow in having my laugh at Bill Jones brought to so untimely an end.

Late that afternoon we came to a formation scarcely less striking than that of Sentinel Rock. It took the shape of an ancient cinerary urn set upon an arched sandstone pedestal placed squarely athwart the mouth of the steep-walled canyon formed by Warm Creek. Like Sentinel Rock, it had been formed by the wearing down of a section of the canyon wall that separated creek and river, and, like the guardian of Wa-weap, it is destined to be destroyed in time by the very forces that created it.

We found no name on the map for this strangely beautiful formation. When it receives one it will doubtless be known as "The Devil's Coffee-Pot," or "Satan's Soup Tureen," or "Hell-High Urn," or something equally sulphurous in savour. The psychology of the professional nomenclaturist is somewhat baffling. In one breath he will bear witness to the divine inspiration he derives from a soaring pinnacle or rocky gorge, and in the next he will be

THE "CINERARY URN" AT MOUTH OF WARM CREEK, GLEN CANYON

LOOKING OUT AT GLEN CANYON THROUGH A NATURAL WINDOW

applying some devilish name to it. Devilish names are highly appropriate for the boiling paint-pots and mud-geysers of the Yellowstone, and, from the trouble he had there, one can understand why Powell should call a certain vicious run of rapids "Hell's Half Mile." For the rest, if they must pull the heaven-stuff, why drag in the hell-stuff? The professional Nature-Describer is no less offensive than the professional Nature-Namer. When both exist (as occasionally happens) in one and the same person the effect is— But let us on with our journey.

Bars and shallows bothered us right along up to dark, when we landed to make camp upon an all-too-narrow strip of shelving sand. There had been more variety than progress in the day's work, and we had our first experience of the extended wading and towing that made the latter part of our run practically amphibious. The next day was better, however, both on the score of water and of weather. I started out inauspiciously by fouling a snag with my propeller and sheering a pin. After that was repaired, luck was good all day. Late in the afternoon a slight recession of the walls marked the approach to the historic "Crossing-of-the-Fathers." An hour later when we pulled in to make camp in the willows a mile above the ford we had reached a point forty miles from Lee's Ferry. We had made up for the poor runs of the two previous days and were once more up to a diurnal average of ten miles.

Father Escalante's party, as I have outlined in some detail in a previous work, had followed the windings of the Colorado all of the way from the mouth of

the Paria in the hope of finding a practicable crossing.[1] Unable even to reach the river with their animals, to say nothing of getting across or out on the other side, they had continued in a northeasterly direction until a faint trail down what was almost a rocky stairway led them to an easy ford evidently long used by the Indians. With the salient natural features still easily recognizable from Escalante's description, it is not probable that the one line of crossing which a pack-train would inevitably have to follow to-day to avoid being swept away would vary more than a few yards to the right or left of the original *"Vado-de-los-Padres."*

A squall that blotted out a flaming sunset was the signal for a celestial pyrotechnic display of dazzling intensity. At times the lightning seemed almost to loop the full circuit of the jagged skyline with interlocking flashes that illuminated the deep gorge of the river with more than the brightness of noonday. The bombardment appeared to be concentrated upon the lofty castellated formations back of the rims, but with black squadrons of reinforcing clouds marching and countermarching overhead, it seemed only a matter of time until one of the batteries got the range of our little camp among the willows. It appears that Escalante encountered almost identical meteorological disturbances the day before his historic passage of the river. Under the date of November 6, 1776, he records that "we were detained some time by a fierce storm of rain and hail that burst upon

[1] See *The Colorado River: Yesterday, To-day and To-morrow*, Chapter II.

us, accompanied by fearful blasts of thunder and flashes of lightning," adding further that "we recited the Litany of the Blessed Virgin, that she might beg for some relief, and God was pleased to cause the tempest to cease."

I read this passage to my companions where we huddled together under a billowing canvas in momentary expectation of the onslaught of one or another of the skirmishing squalls. They were all too dead beat to rouse to interest at the time, but after we had turned in a half hour later certain sounds that I heard from the direction of Bill Ramsaur's cot led me to believe that the lesson might have sunk home after all. The mumbled words were blanket-muffled and indistinct, so it was less what he said than the way he said it that awakened in my mind the thought that my friend had taken a leaf from the book of the pious old Franciscan and was reciting a propitiatory Litany on the off chance that it might win him a night of undisturbed sleep. But presently, following an up-boil of blankets, the fervent words became clearer. I had been mistaken. Bill had not been reciting a Litany, but only borrowing a few excerpts with which to express an opinion of a centipede that had tried to nest behind his ear. Having been somewhat around mules, he spoke with force and conviction; also in infinite variations. He ran the pedal gamut of that centipede: up one side and down the other, with a different name for every leg. When I asked him if there was anything more he could have said if the crawler had actually bitten him, he lapsed into the common and vulgar repartee of a flung wet

shoe. When that missile, caroming off my sleeping-pocket, started to settle down for the night in the nape of Tom's sun-burned neck, I realized how much restraint of language Bill had exercised. After that vocal eruption the down-swooping thundersquall that presently raked us fore-and-aft seemed hardly more than the caress of a summer zephyr.

The disaster which we had hoped against hope would be long-deferred descended upon us in double measure the fifth day. My little engine, which had come in for a terrible banging when the boat bumped along the cliffs the afternoon before, complained in a rising crescendo all morning of an increasing complexity of internal troubles. All that grease and hurried adjustments on beach and bar could effect in the way of relief was done, but they only prolonged the agony until a floating snag caught in the propeller and administered the *coup de grace* early in the afternoon. With the gears grinding past each other, the boat was carried in under a rough bit of overhanging cliff, giving me a rather lively five minutes in working it out and over to smoother water with the oars.

Tom, circling back, passed a line and tried to tow me up the riffle. This failed less from lack of power than because the yawing of my boat interfered with his steering. Lashing alongside worked better, though I had to go overboard and take a line myself before the swift pitch at the head could be surmounted It took us a half hour to round the next bend of the big 'U' that the river forms at this point, there to find ourselves in the grip of a current altogether too strong to be breasted with our makeshift rig. With the

engine wide open, Bill Ramsaur at the oars and me stumbling along the steeply-sloping bank with a tow-line, we managed to work up a quarter of a mile to where the other two boats were awaiting us in an eddy. Here we were greeted with the cheering announcement that Bill Jones's engine had rattled itself to sleep an hour before and now seemed dead beyond all hope of resuscitation.

Tying up for the night we spent the rest of the afternoon trying to instil new life into the dead and dying engines. My motor was still hitting as smoothly and evenly as the first time I started it, but the banged and bruised transmission was plainly a machine-shop job. We decided it would be best to leave it on the bank, with a cache of grub and gasoline, to be picked up on the return voyage. My boat was to be lashed ahead of Tom's and pushed in tandem wherever his motor would furnish power enough to breast the current. When power failed or was insufficient we would have to tumble out and tow. The stalled Evinrude, which was finally coaxed into starting along toward dark, was to be given another day to redeem itself.

Tom had had some experience of driving boats tandem the previous summer, and under his direction we made a very fair job of lashing our respective units in line-ahead. A well-seasoned section of the trunk of a small oak was first secured across the stern of the leading boat. A deep notch in this log exactly in line with the keel received the bow of the other boat and insured the delivery of the push where it would do the most good. The two boats were lashed

together by double ropes along either side. By inserting a strong stick between each pair of ropes and twisting, all slack was taken up and the play between boat and boat practically eliminated. Another rope woven back and forth between the side ropes and running over the bow of the pushing boat prevented the latter from working up and down in its notch. Final alignment had to be effected by careful sighting and the throwing of the bow of the leader the necessary inch to the left or right by taking a half-turn in one or the other of the twisting sticks. The finished product was an astonishingly stiff thirty-six-foot boat that nothing save stranding amidships across a rock or a very severe collision would strain out of line.

The personnel of the component units of the newly-created duplex remained as before. Tom ran the engine and performed his Commodorial functions from the stern of the after boat. Bill Ramsaur retained his acting station on the midship thwart of the same boat, ready to ply the oars or go over-side for a push or tow. I stood by for similar activities on the forward thwart of the leading boat, and also plied a sounding stick when called upon.

The new rig worked remarkably well from the very first. The two pairs of oars that could be brought into action in emergency almost compensated for the loss of the engine. Indeed, on a short sharp pull I am inclined to think we were able to take the double craft up places that neither boat could have made singly with its motor boat without the help of oars. The advantage of having two men wading and towing with one still left to run the engine was

also very considerable. Still better were the three men that could be thrown into the water in the worst emergencies, as where the engine failed, or could not be run on account of rocks or shallows. The great length of the double craft made it extremely awkward to handle in riffles and eddies and the tricky swirls that ambushed beneath the cliffs. Here the proper use of the oars was highly important in keeping the head upstream when the engine alone had not the power to hold it to its course. New and involved navigational problems continued to crop up right along, but where luck and the river gave us anything like a fair chance we usually worked them out.

For a while after pushing off the next morning we ran neck-and-neck with the other two boats. They drew away from us slowly in the long reach of fast-running water above our camp, but we came up and passed both when they had trouble in the shallows at the bend. That was the last we saw of either boat until evening.

Tom had displayed all along a remarkable knowledge of the course and currents of the river, but when he announced that within the next half-mile we could expect to see some of the largest deer our eyes have ever rested upon it did seem that he was risking his reputation, to say the least. As it turned out, however, he was only building up that reputation higher than ever. In rather less than half a mile we began to open up a broad, shallow reach of river, flanked on either side by long, narrow willow-fringed benches. Back of the willow was a heavy growth

of scrub oak and underbrush. Both benches were backed by cliffs, a thousand feet or more in the sheer, and so completely cut off from the plateaus above. That deer should take up their abode at a place where they could be so easily hunted down and cornered appeared too absurd for words; and so it would have been in a region where a hunter appeared oftener than once in a decade.

Bill and I only grinned sceptically when Tom, shouting above the rattle of his engine, warned us to keep a weather eye lifted for deer along the water's edge. "It's ag'in the law to shoot 'em this time of year 'less they 'tack you," he added; "but the bucks are big scrappy critters and you've got to be ready for 'em." I continued grinning, but Bill replied by grabbing up his shotgun and executing a very neat "right-and-left" on a pair of low-flying canvasbacks. I was just leaning on my oars to swing round after the floating ducks when Tom's pointing hand and a triumphant howl directed my attention up the river. There, lunging through the shallows near the right bank, were an amazingly rangy buck and doe, while a spotted fawn, much confused, was just darting back toward the low-hanging willows. Watching us from the shelter of the trees, the detonations of Bill's shots added to those of the popping motor had evidently broken down the nerves of the whole family and sent it scurrying in the direction where there was the most open going.

Bill exchanged rifle for shotgun but held his fire as Tom warned him not to break the law. "Can't shoot 'cept in self-defence," admonished the Commo-

dore; "but don't let that big buck gore the bottom out of us whatever happens. We'll be right among 'em in a minnit." The sardonic grin on old Tom's face as he disposed his defence might have been taken to indicate that the repelling of an attack from the hornéd monster ahead was just the thing he was hoping for. But perhaps I do him an injustice. In any event, if that was what he was playing for, disappointment was in store. The buck is not a fighting animal except in the height of mating season, and that fine springtime frenzy had long gone by in this instance. I doubt if a genuine attack could have been managed even with *picadors* and *banderillas.*

The fugitives kept well above us as long as their way was across the shallows, but once they were beyond their depths and swimming, the current bore them rapidly down stream. Even at the last, when they turned and swam directly against the set of the river, our two pairs of oars and the engine gave us the legs of them. Steering directly alongside the floundering buck, Tom invited me to jump over on his back and take a ride. I demurred, but as a compromise offered to try to harness the animal for reserve power. A gleeful howl announced the full official approval of my tender. Then Tom shouted for me to hold him by the horns till Bill brought up a rope.

Hooking a foot under the thwart for greater security, I leaned out over the side and put Tom's order into execution. Or rather, I executed the first part of it. I held the buck by the horns—for a little while, but not until Bill brought up the makings

of a harness. Bill was ponderous and slow of movement even when he tried to hurry, and by the time he had recovered from putting one foot through the egg-crate and jamming the other fast in a water bucket, the flailing hooves of my hard-held captive were striking onto the solid gravel of the midstream bar. With a firm footing the powerful brute picked up headway like a touched-off rocket. Because of the fact that I did not let go of his horns until a hundredth of a second or so after he catapulted, I was carried along for a way in his comet-like wake of wind and water and flying gravel. I did not go any great distance—not over ten or fifteen feet—but it was quite far enough to give me an entirely new conception of what real rapid transit meant.

Climbing back into the drifting boat, I found that Tom had shut off his engine the better to make his voice heard, and was hotly debating with Bill as to whether or not what had occurred constituted such an attack on the part of the deer as to justify punitive measures. Finally they agreed to allow action to hinge upon whether or not I had any wounds to show from the encounter. Both seemed rather peeved when I exhibited a normal expanse of undamaged hide.

Meanwhile the fugitives had made good their crossing to the opposite bench, or rather the buck had. The doe, in her terror, had continued running so far up the midstream bar that when she did cross to the left bank it was to find herself floundering in deep, swift water at the foot of a perpendicular cliff. Buffeted heavily against the sheer wall and

pawing wildly among the half-submerged rocks, she was all but ready to give up the flight when our very contrite rescue party appeared on the scene. "If you boys have drowned that mother doe," Tom had threatened as he started his engine, "I'm going to leave the pair of you here to nurse that orphan fawn on condensed milk. The contempt some folks have for the life of God's creatures is sure a shame." Bill and I agreed with him and stood by to make our honour white.

It took some nice handling on Tom's part to work his awkward double-header in against the cliff without having it swept broadside against the jutting rocks. He managed with rare skill, however, and when he reversed the engine and backed out, I was leaning low over the starboard bow with an arm round the neck of a fagged out, wild-eyed doe, while Bill sat on the port rail to keep the boat on an even keel. Dropping down to the shallows, I released my burden as near the right-hand bench as the hove-down bow would nose in. But the tired little lady had not the strength left in her trim legs to breast the current even here, so there was nothing for it but for Bill and me to tumble over and carry her to the beach. Bill, who had once seen a girl dragged from the surf at Long Beach, suggested rolling over a barrel and artificial respiration, but they proved not to be needed. Still a bit unsteady on her pins but with rapidly reviving strength, the ungrateful minx kicked gravel in our faces and lurched off into the cover of the baby oaks.

Tom and Bill had another argument when we

waded back to the waiting boat. Bill maintained that since we had saved the lives of both the doe and the fawn by our prompt action, we were morally and legally entitled to take that of the buck in liquidation of Nature's debt to us, especially as we were badly in need of fresh meat. Tom agreed that this was sound morally, but legally, since he could not conscientiously swear that we were attacked, it would not go down. A bruise on Bill's shoulder that he tried to palm off as a hook-mark, Tom readily identified as one already long complained of as from the kick of a shotgun.

"You boys don't live in this country like I do," he admonished, "or you'd be more leary of breaking the law of the land." Then, somewhat inconsistently it seemed, he began crooning his favourite refrain as he primed his engine. "And we miss the kwy-et kum-furts of the jail," was the way it went. What jail, and who missed it, and why, we were never to learn. That was the only line of the song Tom ever sang.

Bill and I never did cease lamenting the loss of that non-belligerent buck. It was not so much that we needed his carcass for food as it was that we needed his hide to cover our own carcasses. With one pair of shoes after another, and one pair of pants after another, being reduced to river silt, it was only a question of days until our blankets would have to be cut up for clothes and foot-wrappings. The hide of that hulking buck would have gone a long way toward postponing that evil day, especially on the score of providing footgear. Fortunately summer was tem-

pering both wind and water to the shorn lambs, and before the turn of the year Providence, like the robins in "The Babes in the Woods," intervened to improvise protection.

Running on in good water until noon, we landed at the mouth of Rock Creek to await the other boats. The riffle here was almost too much for our combined oar-and-engine power plant, and we surmounted it only at the third trial. Lunching, sleeping, and bathing in the clear stream, we whiled away the time until four, when Tom decided we would have to go back to look for the rest of the flotilla. Uncoupling the boats and unloading the pusher with the engine, we shoved out into the current and shot down the riffle we had fought so hard to get over four hours before. Fast as we ran, the shadows were piled deep in the canyon before we came upon the rear division wading wearily through the shallows scarcely a mile above the camp of the night before. Both of the motors had gone wrong within a half hour after starting, and most of the day had been spent in trying to breathe back into them the breath of life. At last they had given up and were towing dejectedly along in search of a camping place. Giving what help we could with engine and oars, we headed in to the first dry bar and tied up for the night.

A good going over in the morning brought Andy's engine back strong, but Bill's was finished for good. Taking it along to have in reserve for spare parts, we rigged the two boats up tandem and pushed them off under the power of the surviving engine. At Rock Creek, after making a second cache of all the

gasoline, provisions and other impedimenta that could possibly be dispensed with, we harnessed my boat ahead of Tom's again and the flotilla proceeded as two double-headers. Keeping always within sight or sound of one another, so that there would be little delay in giving help if needed, we ran right along until almost dark, making up most of the time we had lost the day before.

Although there were no storms in our immediate vicinity during the day, enormous banks of black clouds and the constant mutter of thunder to the northeast indicated a disturbance of great intensity not far up the river. It was many days before we chanced to stumble upon the probable centre of what must have been one of the most terrific tornadoes that region of fierce storms had known in some decades, but an outer splash of the primal fury that had been loosed above came to us that night in the form of a three-foot rise of the river. So sudden was the augmentation of the flood, and so quickly did it sweep over what we had reckoned was an absolutely bone-dry camp, that we decided later it must have come almost in the form of a wave. Andy, who was sleeping nearest the water's edge, was the only one whose bed was surrounded by the rising flood, but the legs of his cot—along with his own—came in for most of the wetting. A lively five minutes sufficed to remoor the boats and get the camp and cooking stuff to a higher level.

The river underwent some recession after that first flash flood, and then started upon a steady rise that was still in progress when we pushed off in the morn-

ing. The principal effect of this was an acceleration of current of perhaps a mile an hour on the average, but a good deal more than that where the river swirled along cliffs or around points. The consequence of this was that we had to scramble out and tow at many places where we could have breasted the normal current with engine and oars. We made good progress withal, but at a punishing cost to shoes, while they lasted, and then to feet. Before the morning was half over only the left unit of my last pair of shoes survived, which accounts for the fact that the sole of my right foot was unprotected when I landed upon the saw-toothed edge of a submerged slab of sandstone in jumping over to keep the bow from swinging at the head of a riffle.

The temperamental crater that is left after a two-inch disc of hide has been gouged down to the raw nerve ends of the ball of the foot is not a pleasant thing to contemplate, and still less pleasant to scramble over river-bottom boulders with. The latter fact was nailed down and double-clinched in my mind during the busy ten minutes that Bill and I reeled and wrestled with the current in keeping the bow upstream and giving the engine a far chance to drive the boat through the crest of the riffle. Back again in the boat, there was just time to loop a handkerchief over the throbbing seat of soreness and change the plastic left shoe to my right foot before the engine was knocked askew by contact with a boulder and we were spilled out again to anchor the swinging bow. For the next hour all three of us were in the river more than in the boats. Then a half mile of

easier water brought us in sight of a deep black gash in the right wall which Tom, with the pleased grin of a man uncorking a pleasant surprise, announced to be the mouth of Bridge Canyon.

"We've fetched it half a day ahead of time, boys," he chuckled. "I'm going to camp and lay over a day to rest and give you a chance to go up and see the Rainbow Bridge. Just one little rapid to pull up, and we're through till day after to-morrow. Feel good, won't it? to . . . Jiminy cripes, what's that?"

The explosive ejaculation was prompted by a heavy grinding roar that assailed our ears as we pushed out above a jutting leaf of cliff that had hitherto deflected the reverberating echoes. An instant later what appeared to me a ridge of dirty white, stretching from the foam-streaked boulder-fan of Bridge Creek right across the river to the opposite canyon wall, gave the answer. Tom had told us that we would encounter our first troublesome rapid at the mouth of Bridge Creek, but that, though there was some really rough water over against the cliff, there was always room to work up a boat along the bar without much danger of having it get out of hand. But troublesome was hardly the word to describe that tumbling wall of rock-churned water. Indeed, annihilative would come nearer to conveying my first impression, for I had known quieter-looking and quieter-sounding rapids that were toothed to grind up a twenty-foot bateau. Far from appearing possible to work up, that rolling patch of boulder-strewn foam looked quite capable of swamping a boat that tried to run down its tossing combers.

There was no use turning to the Commodore for enlightenment. Knowing full well what he *ought* to find at the mouth of Bridge Creek, the fact that what *was* there appeared to be a rip-roaring rapid that might well have been carried down a hundred miles from Cataract Canyon, left old Tom, his face screwed into a knot of puzzled consternation, quite the most mystified one of the lot. Some hint of how the trick had been turned came to us as we worked farther up and saw the gnarled fingers of a score of torrents roaring down through the great boulder-fan at the mouth of the canyon. This muddy discharge was so different from the usual clear stream of Bridge Canyon that Tom came to the conclusion at once that there had been a heavy cloudburst on the upper watershed of the creek—probably on Navajo Mountain itself. How fiercely the flood had run we learned when, on penetrating Bridge Canyon later in the day, marks were found indicating the crest of the descending wave had touched points from ten to fifteen feet above the normal level of the creek. This savage wall of water, rushing out over the "fan" of boulders at the canyon mouth, had rolled a few thousand tons of the great round rocks down into the rapid where the Colorado was crowded against the opposite cliff. This compelled the rapid to shake down anew, so to speak; to reëstablish its disturbed equilibrium. The raw grinding roar came from the new flight of boulders, as its units were banged and bumped along until they found a resting place sufficiently stable to resist the push of the tumbling water.

Crossing two swift but boulder-free channels to the left bank, we started working up through a couple of preliminary riffles to the foot of the main rapid. For a hundred yards or so we had some help from the engine; then the boulders began cropping up too thickly for the good of the propeller and all three of us waded and towed. We were half an hour making the quarter-mile to where the steepest pitch began. By that time the flood from Bridge Canyon was reduced to a few muddy trickles. The hollow "chunk" of a few rolled boulders still sounded from the middle of the rapid, but with most of the migratory pellets rocked into comparative repose, the torn and tossing waves we had first seen were becoming ironed down to a more decorous fluency of ripple. The best of the water still looked a beastly place through which to work a boat up, but, with half decent luck, by no means impossible.

We decided to try it first without uncoupling the boats, not that we had much hope of taking them through tandem, but probably because that would still leave something easier to fall back upon if we failed. Before we had made fifty feet it was plain that we had bitten beyond our ability to chew, that a ton and a half of boat and cargo was excessive handicap for barefooted, sore-footed, stumble-footed men to carry in a steeplechase over water-washed boulders. But because no one of that cursing, laughing, singing trio would be the first to suggest the giving up a foot of the distance we had won inch by inch, we hung on, and wiggled on, and finally won through.

The singing, the laughing, and even all but the most fervent of the cursing, were pretty well confined to the comparatively easy going of that first fifty feet. Once we were out among those rattle-headed boulders that had not yet made up their minds about a bed for the night there was no time for frills. When the footing was firm and the current not hitting above mid-thigh it was all very well to make little jokes about the man who put the rap in rapids, but when one had to duck into breast-deep water to prevent a brute of a boulder from delivering one of those raps, vocal expression was stripped of useless verbiage and became as short, sharp and impolite as the gruntings of a clubbed pig. We may have spat some picturesque curses in the careless rapture of the push-off, and there may have risen the liquid accents of song; all the spitting and liquid accents there were at the finish had to do with getting rid of gulped river water.

That a rolling stone gathers no moss does not necessarily signify that it will not try to collect fragments of epidermis and leg-o'-pants. Where the stones of a rapid have settled down for life on a more or less even keel one who wades among them has some little chance of letting his right foot know what his left foot doeth, but on those "Rock-a-good-bye-baby" boulders there were just about as many "Good-byes" as there were rocks. When one's footing held he had to keep hold of the boat to save the boat; and where he lost his footing he had to keep hold of the boat to save himself. That is to say, one had to keep hold of the boat willy-nilly. This, depriving one of

the use of his hands to ease the effects of a fall, meant that those rolling boulders had to be buffered by whatever section of the anatomy was flirted against their abrasive sides. I rubbed knees and noses with just about every granite pill in that bottle-neck of the river, and couldn't have felt any worse if I had taken them internally.

Tom—many days later, when interest in the lighter things of life had surged anew—remarked that I had looked as red and raw as a new-skinned pig when I came up from my rubbing with the rocks; to which Bill added: "And he hadn't much more on either." This was quite true. When I was fed into the hopper of that riverine grist mill I was wearing one shoe and rather more than half a pair of riding breeches. I came out with a shoelace and a girdle. This takes no accounting of cuticle. As there was a greater expanse of hide exposed to abrasion than there was of shoe or breeches the loss was proportionately greater; but that all grew back in time, so the loss and inconvenience were only temporary.

No sooner were the boats secured in the first eddy above the riffle than Bill and I, like a couple of battle-chewed pups, crawled off among the rocks to lick our wounds and regain our winds. Not so old war-horse Tom, who in body and spirit was compact of sterner stuff. Muttering something like "That's half the job done," he resolutely turned his back on the soft seductions of a rock-upholstered couch and started hobbling down across the boulders to where the other boats were waiting at the head of the dividing sandbar a quarter of a mile below. He did not

exercise his Commodorial authority and order us back into the breach, not even (as had occasionally happened) did he call us "Mister" and suggest sarcastically that any little aid we might render would be deeply appreciated. But the droop of those muscular old shoulders, more eloquent than either orders or sarcasm, evoked sympathetic action where the spoken word might have been met with passive sabotage if not open open mutiny. Hastily securing the wrappings on our unhappy feet, Bill and I reared erect our groggy frames and pit-a-pat-ed off in the water-splashed wake of our game old skipper.

Uncoupling the units of Andy's tandem, we began working them up separately. In theory this should have been a deal easier than shoving through in pairs; in practice, possibly because there were two or three very tired and footsore men on the job, it proved quite as punishing as the initial flounder. We started three to a boat, but whoever was helping Andy and me with the rearmost one fell by the wayside where the boulders rolled thickest and left the luckless pair of us to struggle through by ourselves. Andy's feet, swollen almost to double size from sunburn, were just as sensitive to the biff of a boulder as were my own, so the passage was hardly like tripping through a field of dewy daisies to either of us.

For working up a rapid composed, as that one was at this time, of about equal parts of tumbling water and rolling rocks, three men to a boat are worth rather more than twice as much as two. When a boulder, like the Ancient Mariner, stoppeth one of three, converting him from a help to a hindrance, the

two that remain are usually able to dig in their toes and keep from giving ground. But when one of two goes down in a mess of that kind, the drag of the current on boat and helpless flounderer is rather too much for the survivor to withstand. This was well proven by the continual little setbacks Andy and I experienced. Where the first boat, with three men, was worked steadily, if slowly and painfully, up the riffle, we were swept back from ten to twenty feet a dozen times, and so, inch by shivering inch, had to crab it all over again. By "crab" I mean to refer only to our wobbly, backward action in dragging up the boat. We were each too dead beat to wax vocally critical of the other's towing technique.

Of course we dribbled out at the top after a while; but not lightsomely, not with aplomb. All in all, indeed, I recall no other riffle on the river that took so much out of us and gave so little in return. In fact, so far as I was concerned personally, it wasn't a matter of give-and-take at all. Rather it was all take. Kipling's "Vampire" only stripped her "Fool" to his foolish hide. The water-witch that lurked in the heart of that boulder-scour started in on me where the "Vampire" left off on the "Fool," and continued working inward toward the marrow of my bones. The only reason she fell short of that objective was because there was not another pair of boats to put through the mill.

Too weary for the moment to push on a couple of hundred yards to a clear patch of uncovered bedrock where Tom purposed making camp, we boiled a pot of coffee and lunched where we had landed

among the drying boulders. That relapse to ease cost an extra half hour's work. Falling as quickly as it had risen the night before, the receding river stranded all four of the heavily loaded boats almost under our noses. As their bruised and battered bottoms made it risky to drag them over the rocks any more than could possibly be avoided, each one of the hulking skiffs had to be emptied and carried bodily out to where there was water enough to float it loaded. That dreary task over, we pulled up through the deep quiet eddy backed above the boulder-fan and made preparations for a two-night camp.

To avoid the sweltering midday heat that threatened to broil us alive upon the barred griddle of the sandstone ledge, Tom led us back to the cool depths of an ancient cliff dwelling that notched the right lip of the canyon's mouth. A long siesta, followed by a silt-eradicating soak in the clearing pool below the cliff, restored crushed spirits and bruised bodies to a degree that left them not far from tuning to the peace-purring indolence of our first interval of complete relaxation. Every one (except my unlucky self, who had to cobble and tailor in preparation for the morrow's walk) did just what appealed to his butterfly fancy of the moment. First it was archæological research—excavation for buried antiquities; but that was given up when it was found how peculiarly and distinctively irritating the dusts of the ages are to freshly abraded hide. That, save for some corn husks and fragments of broken pottery, was the only discovery.

Nothing daunted by failing to unearth antiquities, those unquenchable spirits forthwith set to making them. Andy and Bill Jones, armed with cold-chisels and hammers, hacked primitive Moqui pictographs on the sandstone face of the cliff; Bill Ramsaur, squatted squaw-like, whittled a bone needle; Lute chipped arrowheads, and old Tom plied hatchet and butcher-knife in the fashioning of a "nail-less" box for hairpins, whatnots and such-like—what one might have called a Moqui lady's vanity case. I, with my modern dress-making, was the only anachronistic splash in an otherwise perfect Neolithic picture; and yet, when you come to think of it, bacon rind sandals and gunny-sack pants aren't so very unprimitive after all.

All that long afternoon we sang as we worked, sometimes in unison, sometimes—as when the tempo of the chorus failed to synchronize with that of our stitches or strokes—embroidering and improvising on our own. High-domed caves, like tiled bathrooms, enhance one's own ideas of one's own singing tremendously. The blending of the odds and ends of echoes with the basely metallic primal sounds effects a marvellous sort of vocal alchemy, turning raucous bellows of brass and tin to swelling chords of silver and gold. That brand of magic cannot but produce a strange elation in the magician. Personally I was conscious of a great buoyancy of spirit, a swelling of the heart, even a swelling of the head. Perhaps this later effect was the one that lingered longest. As we wended our way back to camp in the deepening shadows I hinted to Lute in all seriousness that

a failure to appreciate the possibilities latent in my youthful tenor was responsible for the ruining of a great artistic career. And Lute, with an ear cocked for the diminuendo of echoes from his silver yodel, nodded sympathetically, as though to give me to understand that a similar shadow had fallen across his own life.

With no predaylight roll-out scheduled for the following morning, we lounged long by the oaken coals of the camp-fire and spun ample-dimensioned yarns of the little things whereby one or another of us had made his own passing point of contact with this or that nib of the universe kindle sparks of strange experience. Tom, the old fox, waited until the infantile ruck of us had poured forth the milk-and-water dregs of our guarded lives, and then swept the boards with a recital of his life as a Wyoming bank-robber, gambler and horse-thief. Where Lute and I had stolen eggs and oranges, Tom had galloped away with the bullion of the Bank of Cheyenne in his saddlebags; where Bill Jones had pilfered a lock of blonde hair, Tom had garnered all the brunette locks in a Paiute village with his scalping knife; where Andy had taken a week to clean up a chicken-roost, Tom had rustled all the steers of a valley at a single drive. Of course it detracted a good deal from the effect when he wound up by confessing that he had only been telling us in the first person stories that actually been related to him by a real bank robber and cattle rustler; but just the same, that round was all Tom's. None of us cared to venture into the ring with him again that night.

It was about at this juncture it occurred to me that the tone of the evening might be considerably elevated by a dramatic recital of something from the classics. Possibly my theory would have worked out all right had I had the temerity to go all the way back to the classics. Unfortunately, in risking my reputation on "Kubla Khan," I only went half way. As a consequence I had the usual experience of the vacillating individual that sits down between two stools.

Telling my companions how John Van Dyke had compared that very Colorado roaring at our feet, to Alph, the sacred river that ran

> "Through caverns measureless to man,
> Down to a sunless sea,"

I proceeded to recite and expiate. The singular appropriateness of the weird lines was all in my favour, and I started confidently, knowing that they would be getting more and more appropriate right along. The witchery of

> "A savage place! as holy and enchanted
> As e'er beneath a waning moon was haunted
> By woman wailing for her demon-lover!"

touched their rough fancies and their comment had point and verve.

The lines that I aimed especially to reach and stress occurred a bit farther along. They told how

"A mighty foundation momently was forced,
Amid whose swift, half-intermittent burst
Huge fragments vaulted like rebounding hail,
Or chaffy grain beneath the thresher's flail."

Here I was going to interpolate a comparison between those huge hail-bounding fragments and the rolling boulders that had given our legs such a biffing that very morning. With the boulders still "chunkity-chunking" down in the rapid to lend atmosphere, that dainty little by-play could hardly have failed to be effective in the extreme, had it ever been staged. There was a metrical bridge to be crossed before I poised for my supreme flight, and in that bridge Coleridge, who could hardly have been expected to foresee the peculiar conditions under which the lines were to be declaimed a hundred years later, had unconsciously rigged a pitfall. That was where I did my Lucifer; and without a wisp of a wing to break my fall. All oblivious of the brink to which I tottered, out onto the bridge I tripped:

"And from this chasm, with ceaseless turmoil seething,
As if this earth in fast thick pants were breathing . . ."

The gushing guffaw that arose as the sartorial significance of that last line sunk home quenched for a space the booming of the imminent rapid. Then it died down and old Tom, rising and stretching himself, spoke the Epilogue.

"If them pants was going any faster than the pair you lost in the riffle this morning, they was sure going some!"

The breath that I might have expended in indignant expostulation I thought better to blow inside of the inflatable mattress that was to cushion my battered form from the prodding knuckles of the sandstone ledge upon which camp was pitched.

With cots pulled side by side the better to mingle the resultant harmony, Bill Jones and Lute Ramsaur, once college glee-club mates, started to sing themselves to sleep with good old sob-in-the-throat, pull-at-the-heartstrings ballads. Lute's throbbing baritone faltered on "The Spanish Cavalier," tripped on the chorus of "Seeing Nelly Home," and died with a throaty croak before the final barber-shop minor of "Good Night, Ladies!" Its lovely companion, Bill's flute-like tenor, was left crooning alone over "Juanita." The last I remember of it—

> "Far o'er the fountain
> Lingering falls the southern moon;
> Clear o'er the mountain
> Breaks the day too soon,"—

savoured somewhat of a weather bulletin broadcast by an amateur radio outfit. Yet as weather forecasts go it was far above the average. Although it was off six or eight hours in the matter of the setting of the moon, it had the relative position of daybreak charted to a hair. I mean to say that the coming of dawn seemed just as premature and unwelcome to that body-bruised bunch of river-rats as it did to Juanita's heart-bruised troubadour. When it comes to tumbling out of a warm bed, bone ache is a good deal like heartache.

CHAPTER IV

RAINBOW BRIDGE AND HOLE-IN-THE-ROCK

THE gorge of which I have been writing as Bridge Canyon appears on the map as Aztec Creek. Bridge Creek, so named from the fact that it is spanned by the Rainbow Natural Bridge, is a smaller stream which flows into Aztec Creek four miles above the mouth of the latter at the Colorado. Both streams head on or near Navajo Mountain. Powell sighted this dominating *massif* from several points on both his first and second voyages, but was unable to spare the time to climb up to it. He correctly approximated its height at over 10,000 feet, and gave it the name of Seneca Howland. The circumstance of Howland's being one of the three men who left the party before the completion of the passage of the Grand Canyon may have had a bearing on the fact that this designation was allowed to lapse in favour of the present one. Had any members of either of the Powell parties endeavoured to reach the mountain from Glen Canyon it is practically inevitable that the discovery of Rainbow Bridge would have been advanced by nearly twoscore years.

Long known to the Navajos, and possibly seen by one or two prospectors at an earlier date, the first recorded visit of white men to the Rainbow Bridge was in 1908. Following its setting aside as a National Monument, occasional parties made their way

in to it with pack-train, usually by Tuba and the Navajo Reservation. The bridge was not reached from the river until late in the summer of 1921, the distinction falling to a Geological Survey party under Hydraulic Engineer Chenoweth, which was boating down Glen Canyon after completing studies in Cataract Canyon.

Our Mr. Tom Wimmer can doubtless be saddled with most of the responsibility if Aztec Creek comes to be popularly known as Bridge Canyon. Tom, freighting for one of the Geological Survey parties of the previous summer, missed the mouth of that gorge once himself. To insure against anything of the kind happening again, either to himself or anybody else sufficiently quick of eye to 'read as he ran' rapids, Tom brought along a keg of paint on his next trip and expended it across the face of the right-hand cliff. It was a generous-sized sign, its length being only limited by that of the face of a generous-sized cliff. The letters were not quite as high as they might have been had not Tom's reach been limited to a scant two feet above his six feet of height. And the pigment might have been laid on a bit thicker if only there had been another keg or two of it. The letters were a bit wobbly, but that was only because the artist had had perforce to parallel the jagged top of the talus of sandstone boulders at the foot of the cliff; and even so the surface of the rapid below was just as wobbly. Altogether it was a very impressive effort, however one was impressed. It read: "Bridge Canyon—T. C. Wimmer." It was rather considerate of old Tom, giving the canyon half of

the cliff. When Ashley painted his name on the wall of one of the canyons of Green River in 1825 he failed to include a single one of the several outstanding local scenic features.

Only four of us responded when the call was sounded for volunteers to walk to the Rainbow Bridge —the two Ramsaurs, Bill Jones and myself. Tom wanted to tinker with his engine and Andy's feet were too badly swollen to be comfortable in what remained of his shoes. Fading feet and dissolving shoes were the increasingly acute troubles of all of us, but the quartette who plumped for the road that morning were shod in mummiform wrappings of adhesive plaster that enacted the dual rôle of near-skin and near-moccasins. The gouged ball of my right foot gave less trouble than expected, possibly because of the diversive effect of a score of other foci of soreness which prevented concentrating thought upon that particular centre of grief.

As tributary gorges of Glen Canyon go, Aztec Creek is fairly easy to navigate. This does not mean that one may walk swingingly or trippingly for any great distances, but only that it is not closed by precipices, slides, or unfordable rockbound pools of water as are so many of the lateral canyons of this region of rock and chasms. The ascent, save for one or two shelving cascades, was gradual, and only in climbing over benches or slides to avoid the stream was it necessary to help scrambling feet with clawing hands.

The effects of the savage rush of the wave from the recent cloudburst were in evidence all along the way. Many of the scant gravel benches at the bends had

been undermined and washed away, and at points where straight reaches had given the flood an unbroken run the native rock was swept as clean of boulders as a city street. Among large trees which had been uprooted and carried away were several cottonwoods, the first we had seen since leaving Lee's Ferry. The swarming beavers, which appear to have a particular predilection for cottonwood bark, have completely denuded the benches of Glen Canyon of this finest and friendliest of riverside trees. Not a single living specimen did we see along the main river in all of the hundred and twenty miles between the mouth of the Paria and Hall's Crossing. The fact that we did find them in every side canyon from which traces of beaver were absent, seemed to leave no doubt as to what was at the bottom of the trouble.

The windowed walls of cliff-dwellings looked down on us at almost every bend, many of them hundreds of feet above the bottom of the canyon. The walls of some of the most loftily located appeared quite unbreached, and even uncrumbling. With sheer cliff below and bulging overhang above, it seemed impossible that any of these could have been visited since their last tenants abandoned them, or died behind their walls. With the red sandstone cliff too abrupt for steps, the original approach must have been made by a series of ladders; but how the first ascent was contrived (short of some such help as Jacob had) is as baffling a question as that relating to the priority of the egg or the hen. One fairly well-preserved-looking edifice appeared just possibly attainable by some such fly-footed scaler as Bill Jones was proving

LOOKING DOWN-STREAM AT RAINBOW NATURAL BRIDGE

Above—AGROUND ABOVE THE NEEDLES
Below—NEAR THE SAN JUAN DAM-SITE IN GLEN CANYON

himself to be. At the moment, however, neither Bill, nor any of the rest of that rapid-ruined quartette, had the legs or the heart thus to flaunt the law of gravity.

The entrance to Bridge Canyon proper, four miles from the mouth of Aztec Creek, proved to be almost as much of a tunnel as a gorge. Overhanging cliffs shut off completely all view of the overhead sky for a short distance, and the clear stream rippled along over sandstone that can never have known the direct light of sun. At the end of a hundred yards the steel-trap cliff-jaws relax, and a ragged ribbon of blue begins broadening out until it roofs a canyon that is rather more open then that of many of the closer-walled stretches of Aztec Creek. The marks from the late flood were not nearly so high as upon the main creek; the earthen benches were less torn, and fewer trees were uprooted. The water of the stream was beginning to warm up under the direct rays of the August sun, but the little springs that came bubbling from under the cliffs all along the way were of almost icy coldness.

Occasional patches of intricately twisted and gnarled scrub cedar alchemized the air to an aromatic cocktail of rare bouquet; or at least that was the way Bill Ramsaur put it. His brother Lute, more romantically if less alcoholically inclined, sniffed the snappy aroma and spoke of wafted incense; thought there ought to be tinkly temple bells to round out the atmosphere; likened our advance toward the Rainbow Bridge to the progress of pilgrims from the outer to the inner shrine—to the very Holy of Holies.

Bill Jones dragged earthward again by opining that "Hole in the Rock" would be more appropriate than "Holy of Holies" in considering comparisons for natural bridges. We were still chattering much nonsense about incense, and not too hallowedly of "Holy of Holies," when the doubling of a cliffy point revealed the Rainbow Bridge. Four gasps checked at their founts four incipient jests of little worth; then four subdued and somewhat shamefaced young men resumed their way with more sedate step and mien. I have heard pilgrims within arm's reach of authentic relics at Budd Gaya and Kerbela indulge in more inconsequential garrulity than any of which that sobered quartette were guilty on their last lap up the sandstone steps to the shadow of the Rainbow Bridge.

Technically and literally, of course, Bill Jones was right; the Rainbow Bridge *is* a hole in the rock. But, like the Grand Canyon, it is a superlatively fine hole of its kind; so fine, indeed, that I am tempted to borrow the remark of Bairnsfather's "Old Bill": "If you know a better 'ole, go to it!" The name, trite as it sounds, is really passably felicitous. The resemblance of the fine sweep of the arch to that of a rainbow is one of form rather than of colour. If one has not been told this in advance he is likely to be somewhat disappointed at first blush in not finding a rainbow-gay slash of spectrum spanning the canyon, an impression, however, that is quickly dispelled as the sheer grace and beauty of the arch itself sinks home.

If one has ever seen any of the other natural

bridges his first outstanding impression of the Rainbow is of the almost airy lightness and gracefulness that characterize its seemingly slender span. This is partly because the first view, whether from up or down the canyon, is restricted to the lightest section of the arch and does not take in swelling abutments that are socketed deep into the mountain itself. The almost overpowering sense of size and mass grow upon one as he approaches, reaching its climax when he stands in the shadow of the soaring span and sees it only as a titanic bar athwart the sky. This impression of appalling size is perhaps the predominant one in the end, though it can never eradicate from the mind that first suggestion of fairy lightness and airy grace.

To say that the Rainbow Bridge is two hundred seventy feet between abutments and over three hundred from the top of the arch to the bottom of the canyon conveys little real sense of its size and not any whatever of its form. The photographs do better as to form, but help little in coming to a conception of size. A human figure introduced as a "measuring stick" is too near the camera to give true scale if placed in the canyon; standing on top of the bridge it is almost impossible to find in the resultant picture. As an example: On our return trip Bill Jones, who in the meantime had attained great distinction as a scaler of cliffs, used his vacuum-cupped feet to clamber to a point on the left abutment almost level with the top of the arch. The pictures taken of the bridge while he was crowning this lofty pinnacle of vantage showed the climber's proudly upreared frame as a

tiny black scratch on the sky. Without a glass one could not say for certain whether it was a man or not. One day when I sought it with the naked eye it was gone entirely, and I had to have recourse to the glass again to find the reason. The precious print had been left lying out on a table, and all the glory that was Bill Jones had suffered total eclipse by a fly-speck!

We had not intended to do any exploring about or beyond the bridge, but after a plunge in a rock-bound pool, and lunch by a crystal spring in a cool maidenhair-draped grotto, sore feet and legs were not quite equal to restraining the aspirations of soaring spirits. Tom had told us that somewhere about the place would be found a register containing the signature of every person who had visited the bridge since its discovery. He was under the impression that it was housed in a niche of the sandstone where the right-hand abutment was tied into the native rock a hundred feet above the bottom of the canyon. The way proved rough for palms of piteous feet to travel, but we persisted in full confidence that the end would justify the effort. The "guest-books" of shrines and national monuments, while rarely edifying, are often diverting—I mean diverting after the fashion of the reactions of such serious persons as word-painters, composers of city boosting slogans and writers of flowery epitaphs.

Failing to find a way to climb out immediately under the bridge, we fared a couple of hundred yards up the canyon and worked on from shelf to shelf until a faint trail leading down from the direction of

Navajo Mountain was found. Following this barely discernible path back along a rocky bench, we quickly reached the point striven for, to be greeted by the ever-beforehand Bill Jones, cursing volubly over an empty book-cover. The register, bearing the fists and fancies of men reputed both great and good, had been violently severed from its binding and borne away.

We all expressed indignation by word of mouth, but Bill Jones—who had been a great admirer of Roosevelt and so doubly curious to see just what degree of "dee-light" his hero had registered, what golden inspiration he had garnered at the end of the Rainbow—went even farther. Bill had been class-poet at college, so it only took him a few minutes to compose what he called a "Pagan Ode," denouncing the culprit and summoning him to expiation at the scene of his crime. As the poet was only warming up in the opening lines, these—with certain conventional substitutions—may be reproduced here with comparative propriety. The benign spirit of this metrical salutatory may be judged from the following somewhat free rendition:

"O! Blankety-blank who stole this book,
You're a blankety-blank-blank-blankety crook."

Bill explained that opening "O" by saying that a Pagan Ode had to begin with an exclamation and end with an exclamation. When we called his attention to numerous other little exclamatory bursts exploding at frequent intervals all the way along and asked him if they also were *de rigeur* in pagan odes,

he admitted that they were not; that they were more or less embroiderings, interjections of his own. Bill had embroidered not wisely but too well. If every one of those little personal decorations of his had been given its proper exclamation point that ode would have looked like a picket fence. Setting down here on white paper any more of it than those comparatively mild opening lines would demand a stock of blanks big enough to stage a sham battle. For that reason I have thought it best to go no farther in attempting to render "Pagan" into "Christian."

The whole lot of us were highly indignant over so shameless a piece of vandalism, else we would never have consented to allow Bill to leave an inflammatory paper of that character between the pillaged covers of the register. The Rainbow Bridge was remote, it is true, but being a National Monument one could never be quite sure who might not be turning up there. That phase of the affair did not occur to us until some days later, and we worried not a little over it until our return visit put an end to suspense. To our great relief it was then found that none had been there since our departure save a Professor of Greek and some ladies from a Chicago university, and the thief himself. Being a classicist, Bill argued, the professor would have understood all about a Pagan Ode; and to understand all would be to forgive all. Whether the ladies were classicists or not we could not be quite sure; but even here Bill's consolatory philosophy extracted balm from potential bitterness. If they were classicists, he explained, they would understand and approve, or at least forgive; if they were

just ladies they would not—or at least ought not—to be able to understand enough to give them a basis for an intelligent misunderstanding. Thus Bill; and rather to the point, one must admit.

As for the thief, we surprised him in his camp when we came to the Rainbow Bridge in force for a second visit, as I shall relate in proper sequence. The character of the miscreant may be judged from the fact that he had not only refused to return the book in response to Bill's impassioned plea, but had actually had the audacity to add the Ode itself to his ill-gotten library. Possibly he had classical leanings himself; which would hardly account for or excuse, however, his cold-blooded looting of the Great Register.

Limping back into camp in the twilight, we found Tom and Andy winding up a busy day of preparation for the impending tug-of-war with the final fifty miles of ever-quickening current that would have to be breasted before attaining our up-river goal at Hall's Crossing. The leaking boats had been caulked, the engines gone over, and another *cache* made of surplus gasoline and provisions. It was like rubbing down and bucking up a banged, battered and bleeding pug for the gong of the closing round.

"Boats are going to pieces and engines all but gone," Tom commented gloomily, trying to jigger his dormant magneto into life; "it's going to be up to you boys to pull us through." Andy replied that he thought he had lost quite as much hide as any of the boats had paint, and as for the engines, if one of them had any harder time starting than he had getting out

of bed mornings he had failed to discover it. We all agreed with Andy that the human units of the outfit were showing the effects of attrition quite as badly as were the mechanical ones, and consequently were just as much in need of goings-over, replacements and general humourings. For an hour we hunched in an aura composed of about equal parts of firelight and self-pity, exhibiting gaunt torn legs and comparing notes on everything from running sores to creeping paralysis. Finally we cried ourselves to sleep. Afoot at five the next morning, we were afloat at six; and that was our best day's run of the voyage!

There are other parts of Glen Canyon more deeply engorged, and so disposing scenery on a grander, more imposing scale, than that of the stretch between the mouth of Aztec Creek and the San Juan; but for sheer seductive, alluring loveliness this almost continuous succession of rock-walled, oak-shaded, fern-tapestried dells is without a rival in the whole length of the Colorado Canyon series. "Titania's Bowers, Limited," which appears to have had a monopoly of the contracts for the decorative work in Glen Canyon, finding ideal form here, has been free to concentrate fairy artificers upon embellishment. The most tantalizing thing on the whole voyage (save perhaps the nesting flies that itched to make a home and raise a family on my battle-scarred legs) was the necessity of passing one after another of these veritable dells of delight without landing for a lounge or a lave. For every last fairy flat of them had, if not a parlour, bedroom and bath, at least a crystal shower, a silver beach for basking, and a ferny couch for drowsing.

A half dozen times during the morning, as the boats bumped up along the foot of a cliff, I filled a cup from a natural bung-hole in the rock without leaving my seat. Bill Ramsaur's complaint about the mug I passed him having no foam on it only shows how cloyed a man's senses become with too much beauty.

Passing by on either bank two superlatively beautiful glens because approach to them was too brushy, Tom landed a half mile above and led us up a dry ravine to an oak-shaded pool at which he had camped on an earlier voyage. Here a tardy reference to my Powell and a hurried calculation revealed that the glen we had passed on the left-hand bank was the one named by the explorer "The Music Temple" when he visited it on the occasion of his first voyage. Dellenbaugh, who saw the place on the second Powell voyage, describes the "Temple" as entered by a "narrow gorge which after some distance widened at the bottom to about five hundred feet in diameter, leaving the upper walls arching over till they formed a dome-shaped cavern about two hundred feet high with a narrow belt of sky visible above. In the farther end was a pool of clear water, while five or six green cottonwoods and some bushes marked the point of expansion. One side was covered by bright ferns, mosses, and honeysuckle. Every whisper or cough resounded. This was only one of a hundred such places but we had no time to examine them. On a smooth space of rock we found carved by themselves the names of Seneca Howland, O. G. Howland, and William Dunn, the three men of the first party who were killed by the Shewits in 1869.

I knew better than to ask Tom to give up a fraction of our hard-won miles to visit even so beautiful and historical a spot as Powell's Music Temple, especially as we would be passing it again on the downward voyage, and doubtless with time to spare. I made mental note that it be recommended for inclusion in the official itinerary. The suggestion was received with enthusiasm when it was advanced in due course, only to have a rival attraction develop at the last moment and crowd the Music Temple off the slate. Nothing less than a premeditated "glenning" party would ever make it possible to do adequate justice to the glens of Glen Canyon.

Dog-tired from our gruelling upstream grind of the morning, we lounged long through the heat of the golden noonday and chattered lightly and whimsically of things of little moment. Bill Jones started off with a plan for making the glens more homelike. Admitting that they were beautiful beyond words naturally, he urged that they lacked life and movement. What was needed were things like pixies and houris flitting about among the ferns. He wondered if they couldn't be propagated in hatcheries like fish, or perhaps, like deer, turned loose in pairs and allowed to multiply. Lute, while disclaiming any past experience as a picker of pixies or a desire to set up as an authority on "Who's Who in Houridom," gently opined that neither pixies nor houris ran in pairs, or at least not in such a way as to effect a vegetative increase. Finally we agreed that a movie company on location would prove the best solution of the problem.

ONE OF THE GLENS OF GLEN CANYON OPPOSITE POWELL'S "MUSIC TEMPLE

PUSHING OFF A SAND BAR

And that, as I recall it, was just about all we were agreed upon. Talking of fairies and pixies brought in other super- or sub-normal folk and developed considerable divergences of opinion. The difference between a gnome and a moron was responsible for one hot argument, and the averred identity of the goblin and the ghoul another. We did agree that one or other of the latter pair had something or other to do with Ku Klux Klan, but which one it was none would be certain. When the leprechaun was introduced, I was rather hard put proving that it was not a tropical disease. My ponderous and academic definition of it as "a figment of the Hibernian imagination" seemed hardly to clear the atmosphere. Rather to the contrary, in fact. All of which came from drowsing through the golden noonday by the fern-fringed pool; we were efficient enough, even in mind, once we had pushed off onto the river again.

We reached the mouth of the San Juan by mid-afternoon, signallizing the event by trying to push an all-too-solidly planted sandstone pinnacle out of the river channel. That was quite the most shattering of the several collisions that we had as a consequence of trouble with the steering gear while trying to nose up through the swirls between rocks and cliffs. Shooting out of a five-mile current that was all but holding us even into an eddy that was boiling upstream at almost an equal rate, the long tandem must have been driving close to nine miles an hour when the obstructing rock loomed dead ahead. The hasty blade I flung into the water had the effect of centring what might otherwise have been a somewhat glanc-

ing blow. The bow of my boat made a perfect bull's-eye and stopped within the negligible distance that flying oak can penetrate anchored sandstone. Everything else kept right on going for a while. Tom's boat tried to telescope through and nest in mine, but, stopped by the oaken log across the stern of the latter, could only rear up on its hind legs and try to hurdle the barrier. The engine did a giant swing in an attempt to leap into Tom's lap, only to die with an explosive snort when its head bumped the stern seat. Ourselves and the cargo simply sprawled, spilled or spread according to how or where the impulse was exerted.

I think Bill was drawing on his imagination a bit when he said that the gunwales became almost hoop-shaped for an instant after the impact, and then slowly sprung back into a certain semblance of their original shapes. To have been an eyewitness of this phenomenon Bill would have had to see through the sack of potatoes we removed from his head as a preliminary to working him out of the V of the bow. Yet the very fact that his Falstaffian figure was wedged into a section of the boat whose normal beam was a foot less than Bill's own furnished unimpeachable evidence that something or other thereabouts had undergone a change of shape.

With the boats leaking cold water as fast as the Commodore was leaking warm words, we swung in against the bank with the eddy and laid up for repairs. A hurried going over the caulking staunched the worst of the flow of water and the flow of words trickled down to whining grunts as Tom, finding his

engine uninjured after its acrobatics, started spinning the wheel. The only permanent damage was to the looks of the nose of my boat. That was changed from aquiline to pug, and a very messy pug at that. The bull's-eye on the rock—it could not have been more accurately centred with a compass—still fixed us with a Cyclopean glare when we pulled by it to camp at the mouth of the San Juan a fortnight later.

The stream of the San Juan achieves the apparently impossible in being just one degree muddier than that of the Colorado. The line of demarcation where the two met and mingled was as sharply defined as that between thick soup and thin gravy in a joint spill on a red tablecloth. Rumple up the smeared damask to an approximation of tumbled cliffs, and the general colour scheme of the nuptial chamber of the San Juan and Colorado would be fairly well maintained. Bill and I tried to be topical by rendering "The Meeting of the Waters" as we chugged off up the river. Somehow Moore's lilting melody seemed hardly to synchronize atmospherically. I think this must have been about equally due to the fact that it had too much about greenery in it, and the fact that we each sang it to a different air. The liquid accents of "She is far from the land where her young hero sleeps" and Bonnie Dundee" would not blend any better than did the liquid discharges of the San Juan and the Colorado.

A long dark line, showing clean-cut like a railway embankment even in the deepening shadows, heralded our approach to "The Hole in the Rock," the scene of the climacteric feat in what stands as un-

questionably the most remarkable migration with wheeled vehicles in all history. The sheer cliff walls on the right appeared unscalable for goats, to say nothing of human beings or pack animals; yet we knew that Tom was telling us the plain unvarnished truth when he pointed to a jagged black crack notching the skyline against the sun-flushed West, and said that through it a whole company of Mormon emigrants had let down their waggons over stone steps blasted from the solid rock preliminary to ferrying across the river and climbing out on the other side on the way to found a settlement on the upper San Juan. The dugway cut out of the rock of the right bank led down to the old ferry landing, Tom said, while a steep grade up the cliff of the left bank marked the way followed to the top of the eastern plateau.

Landing from an eddy in the bend immediately under "The Hole in the Rock," we cut a trail through the willows and pitched our camp along the artificial terrace of the old dugway. The cold spring, from which Tom cunningly deflected a clear trickle of water through a hollow reed, must have been the same that had refreshed the indomitable emigrants during the later months of their stupendous labour. Besides the dugway, the only immediate traces of human activities were the sandstone-slab walls of a building near the spring and some weather-worn initials cut into the jutting rock above the eddy where we landed. This broad smooth sandstone shelf was just the sort of a place where venturesome children would play in the sunlight and sentimental couples rhapsodize

in the moonlight. One felt if only that "sermon-in-stones" conceit would work out those twinkling feet and tripping tongues could have furnished that florid old hunk of rock some very bright and piquant texts upon which to preach.

Some of Tom's Mormon forebears, it appeared, had been numbered in the heroic band, and with bacon and beans he served us epic fragments of history that had come down to him through the years. Most of these had to do with the courage and verve of the women who, it seems, were as ready to bend the back in labour as the knee in prayer, to cheer the days of their men with song as their evenings with dancing. This sounded at the time more picturesque than probable, but I was subsequently to learn that it was literally true. These amazing crusaders, kneeling in prayer at dawn and twilight, broke through the cliff in the daytime and into hosannas at night. And then, to round out the day and take the stiffness out of body and spirit, they cleared a space in the fire-lit circle of the close-drawn waggons and relaxed until bedtime in the rhythmic allurement of the dance. With stuff like that in its pioneers, who can wonder at the splendid force and vitality of the Church of the Latter Day Saints of the present era?

With the patter of raindrops on my sleeping-bag came to my unpillowed ear snatches of Tom's concluding historical contribution. It related to a buxom bride called Betsy, whose young husband showed signs of wanting to sidestep the honour of piloting the first of the prairie-schooners down "The Hole in the Rock." "If you're afraid of getting

dust in your eyes, Jacob," said Betsy sweetly, "just you step down and make room for a driver who ain't." Whereupon she picked up an ox-goad, mounted the bridge of the schooner and told them to cast off the moorings. Thus shamed, Jacob refused to abandon more than half of his seat, and so the old bus swooped down under dual control, thereby gaining a fame that has become almost legendary for a Mormon family whose name Tom mentioned but which my drowsing senses failed to record.

Between waking and sleeping I heard the blanket-muffled comments of my companions on what one of them called the story of "Betsy on the Bumps." Bill Jones seemed to feel that a high-flyer like that must have become a good deal of a termagant when she became the dowager of Jacob's augmented roost. Tom couldn't say whether they ever kept chickens or not; but thought if they had, it would more likely have been Plymouth Rocks than—"ter-whaduycallums, that sounds like snake-bite dope"?

Interested as we all were in "The Hole in the Rock," the ever-present possibility that the failure of our bruised and battered engines would throw us back for locomotion upon an equally bruised and battered assortment of arms and legs made the taking of time for excursions of sentiment quite out of the question. Consoling ourselves with the thought that the presence of several Mormons of prominence with the official party would make an explorative visit in the course of the downward voyage almost certain, we returned again to our daily grind. Quickening current and weakening engines could no longer be

offset by improved teamwork at the oars. Oftener and still more often we would fail in our attempts to fight up through the swirls and eddies of the deep current rolling against the cliffs and have to swing over to the shallows to wade and tow. Frequently even the shallows would prove too much for us, and we would have to wait until the others came to give double man-power.

As the stretches of wading became longer and longer, the abrasions from sharp rocks and the rips and tears from slivery gunwales etched and cross-etched deeper and deeper into scantily protected feet and legs. "Once a wound always a wound," appeared to be the maxim upon which the river worked; or, as Andy varied it, "If you can't pull a man down, poison him!" In spite of all that iodine and peroxide of hydrogen could effect antiseptically, noxious bacteria lurking in the all-pervading silt made the fresh raw rip of one day the running sore of the next and the ninety-nine-year-lease ulcer of the third. As long as we kept to the river no man lost a sore save by having it gouged completely out, and in such event the effacing wound never failed to carry on the family tradition.

The balms and lotions and salves and powders of our big "Chest of a Hundred Remedies" provided whole coveys of colours but never a cure. What a sight it would have been to have beheld from the bank the flashing saffrons and purples and magentas and oxides-of-iron of those rainbow-gay lines of legs as they centipeded out from the head of a riffle into the quiet shallows! I have seen trimmer, softer, more

seductively curving things of the kind twinkling under the calcium of the Winter Garden and the *Folies Bergeres,* but for sheer barbarity of hue nothing west of the late-lamented "Fish Market" of old Cairo to compare with them. Bill Ramsaur waddled on a pair of Etruscan pillars done in terra cotta and cream; the somnolent blacks and blues and slaty-purples of my own robust underpinnings were more suggestive of a couple of Whistler "Nocturnes"; Bill Jones tottered on shrunk shanks that had more than the passing seeming of wavy strips slashed from a Turner's "Sunset on the Grand Canal." Yes, I should say that Bill Jones was quite the brightest of us all, both inside and outside.

Yet in spite of engines that rattled, boats that leaked and knees that tottered we managed somehow to keep plugging along pretty well up to the ten-miles-a-day average maintained since leaving Lee's Ferry. About mid-afternoon of the day following the one on which we had pushed off from "The Hole in the Rock" a sudden change of the formation from sandstone to limestone signallized our arrival at the point where Glen Canyon cut its way through the remarkable geological intrusion called the "Water Pocket Fold." Our interest in this strange pock-marked ridge of yellow rock, wriggling like a dragon for hundreds of miles across southwestern Utah, was less scientific than practical, however. Tom had told us of a camp, established some years previously by a Salt Lake company drilling for oil but long abandoned, where there was a dump containing many useful things. He knew they were useful things, else

why would the company have spent a dollar or more a pound bringing them in there? The mere fact of their being in a dump did not prove they had become valueless, but only that they were hardly worth the dollar or two a pound that it would have cost to pack them out again. Thus Tom.

Eagerly as children we landed at the foot of an oil-streaked bank; reverently as pilgrims we wended our way up to that long-anticipated "Dump of Delight." Alas, and Alack, and then some! Tom had failed to reckon with the besoming waves of that recent series of cloudbursts. What was to have been a "Dump of Deliverance" had become a "Slough of Despair," or a sodden sink of oil, to be more exact. Commodities that it would have cost a dollar or more a pound to pack out to Salt Lake were being carried a thousand miles for nothing. Water transportation always was cheaper than that by land!

It is said that the members of a wolf-pack, baulked of their prey, will sometimes turn inward the fury that has failed of adequate outward expression, and start rending each other. We were not quite as bad as that (although there was some glaring at the perfectly guiltless and entirely well-intentioned old Tom); but anyone witnessing the essentially wolfish manner of our descent upon the remains of a long-dead horse discovered near-by would have been quite justified in concluding that some kind of internecine dispute was in process of settlement. This apparently rough-and-rowdy squabble, however, was really nothing more violent than a very reasonable attempt to divide into six equal parts the potential shoe-

findings represented by the hide of the fallen cayuse. But as in all skin-games, this anticipated stock dividend turned to Dead Sea Fruit as soon as it was declared. Crackling in our grasps like crunched Saratoga chips, that desiccated old hide crumbled to dust and mingled with the Infinite, leaving us as baulked and as bootless as before.

Gathering up various odds and ends of belting and harness for ultimate conversion into sandals, we were about to turn back to the boats when a glad Eureka-like cry from Bill Jones drew us to a half-cabin, half-dugout sort of a structure built against the side of the cliff. Things were very much at sixes and sevens in the depths of the cavelike room, and that's just where the rub—or rather, the pinch—was. A treasure-trove of the discarded clothes and shoes of many undersized men spelt "Eureka" only for our slender and elegant William. "Sixes" and "sevens" were actually the outside limit of sizes among the dozen or more pairs of good strong shoes in the pile that Bill had thrown together for sacking, with trousers, knickers and riding breeches in sizes to correspond. The sizes were actually marked upon the various articles, as we discovered in testing the theory that they might have shrunk from the heat.

In the absence of any better explanation of the reason for this accumulation of pigmy second-hand wardrobes, we accepted Andy's suggestion that the camp must have been established by Scots, who had recruited diminutive labourers to save that "dollar and more a pound" packing charge Tom had assured us had been in force on Salt Lake shipments. It was

not until some days later that a couple of husky Irishmen, who had been prospecting in the vicinity, visited us at our camp at Hall's Crossing and cleared up the mystery. The camp had not been worked by dwarfs and pigmies, they said. They were certain that many big men had been on the payroll, and for the good and sufficient reason that they themselves had stopped at the place and sorted out over a dozen pairs of stout hob-nailed brogans. Somewhat superfluously under the circumstances, they added that the river was hell on leather. "Yep," Bill Ramsaur agreed, eyeing balefully his barked shins; "hell on the hides of both cow and man."

Packing up the least unpromising of the plunder, we pushed off and ran a mile farther along to the upstream limit of the "Water Pocket Fold" formation, where a wide overhanging limestone shelf offered potential protection against the gathering thundershowers. Firing a huge pile of drift on a lip of the overhang to provide light, we laboured far into the night trying to cobble and tailor increased amplitude into soles and seats of the boy-doll-sized shoes and pants that constituted the *pièces de résistance* of our loot. Failing in my effort to make two shoes go where only one had gone before, I concentrated upon combination sandals, compact of cunningly interset fragments of harness collar and blinders, and let footgear go at that. For trousers the best I could do was to synthesise a sort of double apron from two pairs of sheepskin *chaparejos*. Though neither neat nor gaudy, the resultant garment had the advantage of stream-lining readily at the lightest touch of the

current and so diminishing fluid resistance in working up riffles. It was also well ventilated, and so sanitary.

With refinements I was less successful. A red- and blue-banded Panama hat I had pounced upon turned out to have fibres of twisted paper, which reduced to pulp when I tried to sterilize by boiling. As it still retained a certain cohesiveness upon drying, I kept it for a combination fly-swatter and eye-shade, in which dual capacity it continued to function until requisitioned for a dish-rag many weeks later on the Delta in Mexico. A camel's-hair sweater with a rat-eaten arm proved a total loss. After losing two hours of the sleep that is supposed to knit up the ravelled sleeve of care in an abortive effort to knit up that ravelled sleeve of hair, I chucked the hirsute rag into the fire and crawled up to my cave.

Altogether the night was not a pleasant one. First I was roundly rated because the simmering camel's hair smelt like homebrew boiling over on the stove. Then a thunderstorm broke and water came trickling through the porous roofs of our caves. My philosophic companions made rather light of the discomfort and most of them joined Bill Jones in his chorus of "Uneasy lies the head where rain drips down." This Chuzzlewitian attitude on their part was largely made possible by the fact that they had better lies than mine; also because the word connoted rather less to them at the moment. My bed chanced to be spread immediately under the ashes of the big driftwood fire, so that its share of the drippage carried about a ninety-nine per cent solution of con-

centrated lye. Real fortitude, doubtless, would have prompted me to substitute "lye" for "rain" and joined right in with Bill's cheery chorus. But as uneasy is scarcely the word with which to describe the feelings of the man whose rock-flayed leg comes in contact with a jet of pure lye, it is probable that at best mine would have been but a jarring note in that philosophic pæan.

Riffles and shallows came in steady succession the next day, and one or more of us had to be working overside almost from the morning push-off. We managed to avoid a mean-looking hole which Tom called Whirlpool Rapids by lining up a swift but comparatively rock-free side-channel. With a long run of broken water leading down to a cliff-walled elbow choked with great fragments of sandstone, that gooseneck of canyon looked as though it might be a very prolific fount of trouble with water much higher, or even much lower, than we found it. Indeed, Tom spoke of having all but swamped an overloaded boat there the summer before. I made mental note of the place as one where it would be well to have a weather-eye lifting for when our preciously freighted galleys came barging along on the down trip—and then promptly forgot all about it.

Andy's outfit, which had lagged badly all morning as a consequence of engine trouble, finally dropped so far astern that Tom made camp early in the afternoon and turned back with a light boat to lend succour. He found them aground in the middle of a broad sheet of shallows which was crossed and recrossed with half-covered sandbars. By bad luck he

was well into another channel when his gasoline gave out, so that he was not able to get nearer than a quarter of a mile to the derelicts by the use of oars. For an hour or more, helpless as ships becalmed in the windless Sargasso, father and son shouted futile advice to each other across the intervening bars. It was Lute, I believe, who finally found a comparatively simple solution of the problem in wading across to Tom with a can of gasoline.

Lashed together and leaning heavily upon one another for support, the stragglers came oozing up from under the dusky pall of the fallen night. Now and then a motor spat and sputtered, and now and then a propeller spun and kicked ahead; but most of the power, and most of the explosions, came from a temperamental team that wallowed and tugged in the water. Bill Ramsaur and I, who had remained to make camp and get supper, proffered profound if wordless sympathy by mooring the boats and pointing eloquent fingers at the coffee-pot and a Dutch-oven chock-a-block with steaming mallards.

Scarcely had we pushed off in the morning than the keenness of my sporting instinct was responsible for precipitating the most picturesque if not the most serious mix-up of the voyage. Immediately above camp the river was divided by a long narrow island. Reaching the head of the lesser channel, I tumbled overside to keep the bow from swinging in a short fast run of riffle. At almost the same instant Bill Ramsaur, shooting close enough to pepper my sunburned back with wadding, brought down a brace of teal. Having only two hands, the direct conse-

quence of my trying to make a right-and-left retrieve of the down-floating birds was the release of the bow entrusted to my care. Swinging broadside to the current, Tom's tandem went rolling back to be impaled amidships on the bow of the leading unit of Andy's. Then, tangling and twisting like a team of fighting huskies, and to the accompaniment of a staccato fire of exploding gasoline and profanity, all four boats ambled over and began to play "Waltz Me Around Again, Willie" with the boulders fringing the foot of the cliff.

I was swept off my feet in lunging for the second bird after capturing the first, but had the presence of mind to press the chase hotly all the way down the riffle. That gave Tom something to divert his mind from his own troubles, and probably saved me a court-martial for letting go of the boat. When I floundered up to where the tangle of wreckage had stranded across a midstream boulder, all he did was to grin and ask me why I did not complete the spaniel effect by carrying the ducks in my mouth.

The mess proved to be by no means as bad as it looked. A few minutes sufficed to bail out shipped water, disentangle lash-lines, true up alignment, and push off again.

A sharp fall where a reef of the native bedrock ran all the way across the river (the first place of the kind we had seen) gave us a hard rough-and-tumble of a fight, and the engine had to have help at three or four other places in the next mile or so. Toward noon we came to a long hard-running rapid formed where two large streams, flowing in from the right

side but a few hundred yards apart, had spewed broad bars of boulders. Many an easier-looking run of water had forced us to wade and tow, but this time a resolute attack with oars and engine won out.

Dead beat at the end of the inch-by-inch struggle up that last hundred yards where the full force of the current went swirling along the cliff, Bill and I jack-knifed down into heaving heaps the moment the boats were free of the unrelenting drag. Neither of us registered more than passive interest when Tom announced that he was running across to land for dinner "under them big willows overe there." But when the sound of the propeller churning in soft silt awakened us to a realization of the fact that we were nosing in against a vile-looking bank of sun-blistered mud our outraged spirits flamed up into open mutiny. Growling that this reeking sink was no place to take tired men to recuperate, we pointed to a dewy-fresh glen in the shade of the opposite cliff and intimated that unless we could lunch and rest where it was cool and pleasant we would rather keep right on going until we reached Hall's Crossing. Old Tom only grinned indulgently, as a mother might at a pair of prating brats, and told us to tumble over and tie up.

Orders where argument was expected put a different face on things. I was a couple of jumps ahead of Bill in tumbling over, and so had the help of his strong hand to drag me back into the boat when I brought up just short of eye-deep in all but bottomless mud. We were in the midst of a renewed protest against the unseemliness of the place for a luncheon halt when Tom, watching his chance as

the current swung the boat against the bank, made a quick catlike leap and landed on solid earth. Maintaining his precarious footing by gripping a dangling willow-root, he turned an expanding grin upon us and announced. "Hall's Crossing! All out for a week's rest-up, wash-up and fat-up!"

CHAPTER V

NEAR SIGHTS OF DAM-SITES

We had bucked the current of the Colorado for two weeks, the six of us, to the end that a party of engineers of the United States Geological Survey should have ready a flotilla of boats to carry them back downstream to study the dam-sites of Glen Canyon. Various rumours had been rife respecting the personnel of the expected party. Some of us had heard that it was to include President Harding and Secretary Hoover and a formidable Senate committee; our least impressive list included the Governors of the seven states of the Colorado River Basin. But it wasn't so much what they were as what they had that intrigued that gaunt, hungry sextette. For a week we had been out of soap, and for three days reduced to a ration of boiled flour and sliced pineapples. Exalted personages must travel with vast quantities of sustaining foods, and as for soap—not the least sophisticated of us but knew that the word was practically synonymous with Governors and Senators.

And then the long-awaited calvacade came winding down to the river from the cliffs above Hall's Crossing! There was not a Governor, not a Senator in the lot, and the only President presided over a Mormon Stake. Worse still, as we discovered

when we rifled their baggage under cover of darkness that night, about the only soap they had was an ill-assorted collection of those minute little one-wash cakes which unprincipled travellers are wont to lift from hotels. They had a large supply of wholesome food, though, and not all of their cigars were bad. Indeed, those of Arthur Powell Davis (according to Bill Jones, whom I found smoking one down among the willows) were distinctly good. Bill's taste was probably a bit vitiated, however, from the maple syrup-vanilla extract cocktails another of the looting river-rats had been mixing from the newly arrived stores.

When we came to con the roster of the party which we were to watch over on the river it transpired that, as is always the case with a desert-travelling outfit, it was a good deal more impressive lot than appeared as it straggled in. Although there were no political lights in the party, it included men who had already done outstanding work in Colorado River Basin development, and who are destined to exercise a decisive influence upon the future of that great work. Indeed, it has occurred to me since that we stowed away more highly trained technical brain power and practical common sense in our four skiffs the next morning than the legislative chambers of certain Colorado River Basin states one could mention have known since their admission to the Union. But take a look at the list.

Arthur Powell Davis, Director of the United States Reclamation Service.

Dr. John A. Widtsoe, Ex-President of the University of

Utah, Commissioner of Education and an Apostle of the Church of Jesus Christ of Latter Day Saints.

Herman Stabler, Chief Engineer, Land Classification Board of the United States Geological Survey.

Colonel C. H. Birdseye, Chief Engineer, Topographic Branch of United States Geological Survey.

Clarence C. Stetson, Secretary of the Colorado River Commission and Assistant to Secretary of Commerce Herbert Hoover.

R. E. Caldwell, State Engineer of Utah and Member of the Colorado River Commission.

H. W. Dennis, Chief Construction Engineer of Southern California Edison Company.

R. D. Young, President of the Stake of Richfield of the Church of Jesus Christ of Latter Day Saints.

Franklin Thomas, Professor of Civil Engineering of California Institute of Technology.

Charles P. Kahler, Engineering Department of the Union Pacific Railroad.

E. C. La Rue, Hydraulic Engineer of the United States Geological Survey.

To one of my fellow roustabouts who still seemed inclined to register disappointment over the fact that no Governors had turned up, old Tom Wimmer spoke reprovingly and elucidatingly. Dr. Widtsoe's presence alone, Tom averred, more than squared the account. For wasn't the Doctor one of the Twelve Apostles of the Mormon Church? And wasn't "a Twelve Apostles more than all the seven Guv'nors of the Colorado Basin states rolled into one?" I never quite understood upon just what common denominator the balance between Governors and Apostles was struck, but I was quite in agreement with

Tom's conclusion. Dr. Widtsoe was one of the few members of the party who had not stocked his soap supply from the Hotel Utah in Salt Lake City.

Mr. Davis and Mr. La Rue, foremost authorities on Colorado River development problems, gave us illuminating outlines of the situation from its different angles as we sat around the camp-fire. Mr. Davis explained that because the most urgent need, flood control, was exclusively a problem of the Lower Basin states, the Reclamation Service had not yet elaborated any comprehensive plan covering the states of the Upper Basin. The upper Colorado or Grand, he said, between the mouth of the Blue and that of the Green, had a fall of thirty-six hundred feet, with the possibility of developing perhaps 2,000,000 horse-power. The Green was capable of furnishing about one-third of this amount of power, being inferior to the Grand in fall, volume and in the character of its power sites.

He stated that the most favourable point for power development in the Upper Basin was at the Kremling site, just above Gore Canyon on the Grand. Some power had been developed there by private interests, but the work had been badly bungled. Several hundred thousand horse-power could be developed at Kremling, within practicable transmitting distance of Denver and most of the mining camps of Colorado. The Dewey site, on the Grand below the mouth of the Dolores River, was also a very favourable reservoir and, as it intercepted practically the whole flow of the river, had great power possibilities. It was, however, rather too remote from

any considerable markets for present development.

There were many good reservoir sites on the Green, he continued, at all of which power could be developed. Most of these were within reasonable transmitting distance of Salt Lake City and other intermountain markets. That at Flaming Gorge he considered as the logical first development on account of its proximity to the railroad. Brown's Park and Ouray would be the next in order, though the latter might be ruled out because it was in the way of a proposed railway line between Salt Lake City and Denver, which was generally regarded as the more important enterprise of the two.

Unless the Government showed a disposition to handle all of the Colorado as one comprehensive scheme, it was Mr. Davis's opinion that sooner or later a considerable part of the power development would be turned over to private interests. This was especially true of the Upper Basin, where there was little immediate need of development for flood control or irrigation, and where the power companies already in the field had shown a desire and ability to undertake the work. It was still Mr. Davis's belief, however, that the development of power on this whole watershed should be conducted by the Government on account of the conflicting interests and dependence of one development upon another. Unless all of these power sites were ultimately under one management he felt that they would waste an immense amount of water for lack of coördination of the uses and the markets.

Mr. La Rue, who had been the Hydraulic En-

THE *"FLAGSHIP"* UNDER FULL POWER. LEFT TO RIGHT, BIRDSEYE, FREEMAN, CALDWELL. STABLER, KAHLER, WIDSTOE, DENNIS, DAVIS, LA RUE AND WIMMER

OUR EVENING DANCE BY THE CAMP-FIRE

gineer of the United States Geological Survey party studying Cataract Canyon the previous summer, told us briefly of the potential dam-sites below the junction of the Grand and the Green. These, he said, on account of their remoteness from power markets and the fact that they would not impound water for irrigation, need not be considered at the present. That brought us down to Hall's Crossing, the point from which we were pushing off in the morning. It was his plan to survey the most promising of the half dozen dam-sites we would encounter in traversing the hundred and twenty miles of Glen Canyon between there and Lee's Ferry. This would take us to what he considered the most favourable of all reservoir sites on the Colorado, that near the foot of Glen Canyon. Save that at the mouth of Diamond Creek, little was known of the many possible dam-sites in the two hundred and eighty miles of continuous gorge forming Marble and Grand Canyons. Conclusions respecting the place of these in the general plan would have to await an accurate survey. Mr. La Rue said that he hoped to arrange for at least a portion of the party to go in with him to the Diamond Creek site after the Glen Canyon voyage was over, and possibly around by Las Vegas to the sites in Boulder and Black Canyons.

It transpired in the course of the evening that while Mr. La Rue's keen technical mind had led him to pin his faith to the lower Glen Canyon dam-site as the one best adapted to bringing about the most favourable solution of the problems of the lower Colorado Basin, Mr. Davis and the Reclamation Serv-

ice were equally convinced as a result of their studies that a dam in Boulder or Black Canyon would be better calculated to answer all needs. Where such eminent doctors were in disagreement, Bill Jones and I found it rather difficult to come to a decision in our own rather immature minds. Bill was carried away by Mr. La Rue's enthusiasms for Glen Canyon, I with the impeccable logic of Mr. Davis's presentation of the case for Boulder Canyon. We wrangled a bit about it over a looted carton of raisins before turning in for the night, but finally shook hands and decided to do the sensible thing. We would wait until we saw the respective rival dam-sites and then decide for ourselves from first-hand evidence.

The next day Bill came to me and, with a sheepish look on his face, said he had come round to my—and Mr. Davis's—way of thinking as to Boulder Canyon. When I pressed him for the reason for his sudden *volte face* he displayed two cigars of widely diverse origin and excellence. A ropy Pittsburgh stogie, as leprous of wrapper as of filler, I recognized as twin brother to one La Rue had been smoking the previous evening when he was the only man in camp not complaining of mosquitoes. The other was a Corona-Corona, delicate of texture as of aroma, and plainly one of a box Mr. Davis had been passing to all and sundry at the noonday lunch hour. I reproved Bill for judging the La Rue dam-site by his cigars, and just to make the lesson sink home pocketed and kept the Corona-Corona. That is to say, I kept it for about an hour. At the end of that time, having to go over the side to push the boat off a

midstream bar, I tossed my treasure into a pair of waiting hands for safe keeping. When I climbed back to my seat Hydraulic Engineer La Rue of the United States Geological Survey, a look of Nirvanic calm on his wontedly austere countenance, was wrapped in the fumes of a fragrant Havana and assuring his neighbour that he sure did appreciate a good thing when it came his way. I muttered in my beard and looked hard at a muddy object in the bottom of the boat. But no—one can't throw a sodden shoe at the Chief of Party, especially when he happens to be an authority on the hydraulic problems of the Colorado. My respect for Mr. La Rue's keen practicality has augmented from that moment to this. Indeed, I am even inclined to take more or less literally the tribute of a colleague who said: "If La Rue doesn't happen to have just the sort of a dam-site he wants, he can usually go out and run it down inside of a week or two."

For the voyage down Glen Canyon we rigged the four boats tandem by pairs, just as on the final part of the upstream journey. Tom Wimmer ran the engine and directed the movements of the flotilla from the rearmost unit of the "Flagship"; I handled the oars of the forward unit. Not necessarily the most distinguished, but rather the most serious-minded, of the party were concentrated in the two units of the Flagship. With the exception of Dr. Widtsoe, these were all engineers, and the reason for thus grouping them was to allow a free discussion of what they saw as they went along. In Tom's unit—the bridge of the Flagship, so to speak—were Mr. Davis, Mr. Widt-

soe, Mr. Dennis and Mr. La Rue; in mine Mr. Stabler, Mr. Caldwell, Mr. Kahler and Colonel Birdseye. The latter volunteered to act as my "Bosun," and served faithfully throughout the voyage. His principal duties were to keep the painter neatly coiled and leap lightly with it to a rock at landing; then to stand by and see that none of the party walked with muddy boots upon my rowing cushion. His only fault was over-zealousness, usually manifested by a penchant for jumping over into soft mud at the first sign of grounding—a duty I felt to be particularly and distinctively my own because I, with my dwindling fringes of shirt and trousers, was more fittingly garbed for it.

The other double unit of the flotilla was commanded by Andy Wimmer, as engineer, with Lute Ramsaur at the oars and Bill Jones as roustabout. The passengers were Mr. Young, Mr. Stetson and Professor Thomas. Mr. Young was volunteer Bosun, but his real natural genius for the onerous work was lost on a craft which, through laxity of discipline, was a disgrace to the fleet from first to last. Indicative of the character of the motley crew is the fact that when, entirely in opprobrium, the more sedate and controlled of us called them "The Pirates," they promptly seized upon the name and proceeded to live up to it by singing ribald choruses and committing various acts of lawlessness.

The first potential dam-site was reached a few miles below Hall's Crossing. After a half hour's inspection it was passed up without a survey—on account of a too considerable cross-section, if I remem-

ber correctly. It was during our brief halt at this point that Tom Wimmer called me aside to confess that he was seriously worried for fear the voyage was going to be too monotonous for our guests and to ask if I had anything to suggest by way of relief. I mentioned stranding them for the night on a bar of quicksand as worthy of consideration, but Tom ruled against that as calculated to aggravate his own rheumatism; also as a shade too drastic. What he wanted was something that would thrill without harrowing. What did I think about giving them a good sloppy run down a rapid? When I protested that there was no such thing as a properly sloppy rapid in the whole length of Glen Canyon, he pointed out that the fact all of the boats were loaded to the gunwales might be depended upon to generate considerable sloppiness on its own account. In fact he was sure it would, especially if he opened up the engine and I provided additional headway with the oars at the right moment. And so, in our rough, simple way, Tom and I planned to relieve the ennui of our passengers. Whirlpool Rapid, a mile or two below, would be a favourable location, Tom reckoned.

In spite of its sinister name Whirlpool Rapid, in September at least, is a comparatively innocuous riffle. A novice in a lightly loaded boat would have to make a considerable effort to get in trouble there. Tom and I were making a special effort, however, and neither of us was a novice when it came to looking for trouble. When Tom threw open the throttle and I, at his ecstatically grinning nod, laid back onto the oars, a good seven or eight miles an hour

was added to the eight or nine that our over-laden double-header was slipping along over the tops of the all-too-shallowly submerged boulders which formed the rapid.

I am quite positive that hitting the big foam-masked rock at the head of the rapid was no part of Tom's plan. Such a collision would hardly have been one to be courted lightly even with new boats; with those sodden, water-soaked bottoms of the craft in which we were riding it was asking for just about what happened. There was no sharp, smashing impact to the blow when it came, but only a dull, heavy thud like that from a kicked pillow. I felt the nose of the boulder pass under my feet as the rotten bottom oozed over it, to be immediately followed by spurts of incoming water. Tom's boat, even deeper laden than mine, was still more savagely gouged. Then the boulder sideswiped the propeller, knocked the engine askew on the stern and killed the motor. At the same time a douche of muddy water over my bare legs told me that our deeply submerged sides did not present enough freeboard to exclude all of the waves of even this comparatively gentle rapid.

The water was swishing about my ankles even as I started to swing the wallowing tandem into a smoother channel with the oars, and before it was finally caught by an eddy and carried up to the bank the red flood was coming over in bucketfuls at every lunge. Facing the whole congregation as I rowed, I was able to observe the full effects of our little diversion: and that (as I have thought of it since) was the cream of the performance. Fresh from their

jolting waggon ride over the mountains, our guests were finding even the worst of the river road surprisingly soft and easy going. Taking the bumping and splashing as a matter of course, all of them had gone right on with whatever they had been doing. I remember particular Birdseye with his opened map, Caldwell munching raisins, and Mr. Davis and Dr. Widtsoe in animated conversation. The only perturbed countenance was at the farther end of the long row. It belonged to that arch jester, Tom Wimmer. He afterward said the same thing about me and my countenance.

Most of the noon-hour halt was spent drying out baggage and trying to patch the torn bottoms of the boats. Neither operation was wholly successful. They were still swabbing Colorado River silt out of bed-rolls at the end of two or three days, while the leaking bottoms demanded the services of hands with bailing cans all the rest of the voyage. Fortunately no one ever suspected what, or rather who, was at the bottom of the trouble. Indeed, even this tardy confession will hardly convince more than one or two of the party that honest old Tom had anything to do with it.

After turning down another potential dam-site (this time on account of faulty foundation conditions) where the great Water Pocket Fold crosses the river, we camped for the night upon a hard stretch of sandy beach just below the mouth of the muddy Escalante. Bosun Birdseye, unamenable to discipline when off watch, gave a bridge party in my boat after supper, littering with candle grease the seat

and cushion which it was his principal duty to keep immaculate during the day. A threat of disratement to the rank of Ordinary Bailer (held jointly by Caldwell and Stabler) had the desired effect in the morning and further orgies were held ashore.

La Rue, with a voice as raw and strong as his own stogies, woke us up at daybreak with a song which began:

> "I like to get up in the morning
> Where the morning glories glow,
> And to wander in the wildwood,
> Where the songbirds say 'Hello!'"

The raucous bellow of that boomed "Hello!" became our rising bell for the rest of the voyage.

In mid-forenoon of the second day we landed at the foot of the famous "Hole in the Rock" and climbed a thousand feet to the brink of the cliff down which that stout-hearted band of Mormon emigrants had lowered their waggons nearly half a century before. An idea of the steepness of the ascent may be gained from the fact that we were compelled to use our hands as well as our feet in clambering up considerable stretches. The last quarter of a mile was a veritable stairway, with the marks of the picks and the drill holes for the powder still showing in the hard sandstone. It seemed beyond belief that waggons could have been taken down there without complete destruction, and yet it is a matter of history that the feat was accomplished. An ox-horn and the remains of a windlass improvised from the wheel of a mowing-machine were all we found to indicate the passage of

the dauntless wayfarers. Dr. Widtsoe told us something of the epic story when we came back to lunch in the shadow of the willows by the river, but there is no place for it here.[1]

We camped that night just above the mouth of the San Juan, and in the morning, scouting a half-mile downstream, La Rue discovered a dam-site that seemed really worth surveying. At this juncture our distinguished Chief-of-party revealed a golden vein of sentiment streaking the grey iron of his normally rather grim and austere temperament. Confessing that while he was by no means certain that dams would be built for many years at any of the sites we were about to survey in Glen Canyon, he still thought it would be a sort of nice thing if every one in the party should have something to do with these preliminary studies. Then, in the event a mighty barrage was finally constructed, it would put us in on the ground floor, as it were—give us something to tell our children. Birdseye and Stabler were designated for the honour of doing the technical instrumental work of this first survey, with Professor Thomas, Bill Jones and myself acting as rodmen.

I disqualified myself almost at the outset through inability to hold the numbered strip of canvas they called a rod in a perpendicular position, apparently quite an important point for some occult reason. Thomas, being a professor of Civil Engineering, seemed to grasp what was wanted of him but a hearty breakfast made his movements rather logy

[1] For a brief account of the "Hole in the Rock" story see Chapter IV.

and so largely stultified his usefulness. Bill Jones, after a lifetime of groping, came at last to his own. He was a born rodman. Climbing with his cupped, fly-like feet, he flitted from rock to rock with the light and airy grace of a fairy queen fluttering from flower to flower. Once, heaven only knows how, he appeared on the top of a great balanced rock perched precariously on the brink of an overhanging cliff. As the hair-poised boulder began to sway, I rushed to save my fellow roustabout. Not his life—that seemed beyond all hope—but the record of his deed for posterity. My fast Zeiss-Tessar caught him midway of his forty-foot leap, literally between earth and sky; but before I had reached the spot in person to take his last message, Bill, bouncing like a rubber ball, had picked up his rod and was capering off for another sight. Such a leap to solid rock would have left an ordinary human being picking ankle bones out of his back hair from the telescoping; Bill merely complained of the heat of scoured hob-nails burning through to the soles of his feet.

Dr. Widtsoe was so impressed by that wonderful leap that he suggested it be commemorated by applying the name Bill Jones to a natural bridge sighted later in the day. Mr. Davis, admitting the fitness of the name, stated that it was contrary to a recent Government ruling to name natural features after living men. At this juncture the keen, practical La Rue cut in. "Just let Bill go on rodding for a day or two more and that particular obstacle will be removed," he said in his bright, cheerful way.

The next day a dam-site was surveyed at the mouth

BILL JONES' FORTY-FOOT LEAP TO SOLID ROCK

LUTE IN THE PROW WATCHING FOR DUCKS

SURVEYING A DAM-SITE IN GLEN CANYON BELOW THE MOUTH OF SAN JUAN

of Oak Creek, and the following day was spent on a trip up Aztec Creek to the Rainbow Natural Bridge, Here that keen-eyed woodsman, Mr. Young, trailed to his den the thief who had stolen the Visitors' Register, as revealed on our upstream trip. In the interval since our late visit the culprit, a grey squirrel, had taken the occasion to annex for nest-lining the Pagan Ode Bill Jones had written in denunciation of the original thievery. The Register, which contained a number of well known names including that of Colonel Roosevelt, was put back between its covers and installed in a squirrel-proof biscuit tin; the Denunciatory Ode it was deemed kindest not to attempt to restore.

The rapid below Aztec Creek, which had returned to a stable equilibrium since the storm that was reshuffling its boulders when we passed up it before, gave us no trouble. The Pirates, who had been growing more obstreperous and riotous day by day, were guilty of a particularly shameless atrocity a few miles below here. I have already written of the trouble we had taken to rescue a pair of swimming deer on the up-trip. We had been highly commended by all of the more humane members of the party for this merciful action, and it was tacitly agreed that every effort would be made to succour all distressed animals encountered on the downward voyage. The Pirates understood this quite as well as did the rest of us, but their attempted rescue work, when the chance arrived, was so clumsily conducted that the big buck they claimed they were trying to help tangled his horns in the ropes lashing together the

two boats and was all but drowned. They left him on the beach with a bucket of condensed milk and raisins, but were too much afraid of being late to supper to wait to see if their victim revived sufficiently to take nourishment. It was just the sort of thing one could have expected from such a crew of ruffians, but nevertheless, especially in view of the example set them by our previous action under similar circumstances, rather a shock.

We spent two days in a picturesque camp at the mouth of Warm Creek, giving the engineers time to study the reservoir site of a dam some miles below. The spillway of this reservoir would extend from the headwaters of Warm Creek to those of Sentinel or Wa-weap, and in meandering this it is probable that we passed along the identical trail followed by Escalante as he approached the Crossing of the Fathers toward the end of his famous *entrada* of 1776.

Our next camp was in the shadow of Sentinel Rock, at the mouth of Wa-weap, and early afternoon of the following day took us to the site of the so-called Lee's Ferry Dam, a few miles above the foot of Glen Canyon. Or rather, the Flagship and its passengers arrived at that important point; the Pirates, for some nefarious purpose of their own, were hanging back.

As the chief sponsor of the Lee's Ferry Dam, the occasion was one of outstanding importance to Engineer La Rue, who had evidently been giving considerable thought to the *mise en scene.* Unfolding an enormous map of the dam and reservoir site

specially prepared by Colonel Birdseye, La Rue grouped his distinguished guests around it and, pointer in hand, was just beginning a learned and technical dissertation on the fine points of his pet project when a chorus of ribald yells from up-river broke savagely upon our ears. The low ill-kempt craft of the Pirates was just coming into sight at the bend. At its bow flew the "Jolly Roger," the skull and cross-bones painted, as we discovered later, with the red juice from a can of beet-root. Most of the sinister figures had the conventionally bound brows, with flashing rings of newly-cut biscuit tin dangling from noses and ears. Several of them brandished axes and two or three of them had to remove knives from between hard-clenched teeth every time they cursed and howled.

Revolting as was the sight on so serious and impressive an occasion, the actions of the ruffians was no less offensive as they came barging down to impinge upon the carefully composed picture. Led by Thomas, they sang *"Fifteen Men on a Dead Man's Chest, Yo, ho, ho and a bottle of Rum,"* and then landed to present a Round Robin expressing sympathy for the Bolsheviki and demanding free beer and an extra ration of maple syrup.

To La Rue, for a thing of this kind to happen at Lee's Ferry dam-site was no less than sacrilege. Mr. Davis, however, in whose scheme of development this particular site bulked less prominently, took the by-play in good part, replying to *"Yo, ho ho!"* with *"I Am the Pirate King,"* which he had sung in his youth in "The Pirates of Penzance."

When order was restored La Rue went on with his lecture, but the pirate motley and irreverence still struck a jarring note. While Mr. Davis and La Rue were collecting specimens of the canyon walls, we roustabouts had a straw-vote on the comparative merits of the Lee's Ferry and Boulder Canyon dam-sites. The only votes I remember were those of Lute, who favoured Lee's Ferry because the canyon walls gave back an especially mellow echo to his yodel, and of Bill Jones, who plumped for Boulder Canyon without giving a reason. There was no need for him to have done so; we all had seen him take *two* of Mr. Davis' cigars when the box was passed after lunch.[1]

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Upon the disbanding of the Glen Canyon party at Flagstaff, which was reached from Lee's Ferry by truck and auto, another party was formed to visit the most notable of the dam-sites lower down the river. This consisted of Messrs. Davis, Stetson, Caldwell, Stabler, Kahler, La Rue and myself. Going by train to Peach Springs, on the Santa Fe, we started for the mouth of Diamond Creek in the only three autos possessed by the little mountain village. The road, which had not been repaired since the last rains, was reported as passable for only a part of the distance. Camping for the night at the foot of auto navigation, we proceeded in the morning on foot.

At the camp at the mouth of Diamond Creek we

[1] For a less frivolous comparison of the Lee's Ferry and Boulder Canyon dam sites, see *The Colorado River: Yesterday, To-day and To-morrow,* Part II, Chapter III.

found awaiting us James B. Girand, the engineer who had filed upon the dam-site at that point, and W. S. Norviel, Colorado River Commissioner for Arizona. This site is the outstanding one of the Grand Canyon less because it is especially favourable for dam construction than because it is more easily reached from the railroad than any other point on the Colorado between Green River, Utah, and Needles, California. Mr. Girand, an engineer of outstanding achievements, surveyed and investigated the site—including diamond drilling for bedrock—at the request of the Federal Power Commission. Having fulfilled all requirements, it is understood that the Commission is ready to grant him the necessary license, and that the latter is only held up temporarily pending the action of Arizona upon the Santa Fe Compact. As the reservoir site above Diamond Creek is comparatively restricted, the construction of a power dam at that point would ultimately require the building of a dam somewhere in Glen Canyon to provide greater storage.

Diamond Creek is also the site contemplated in the grandiose plan advanced by George Maxwell for a dam that would divert practically the whole flow of the Colorado and distribute it to 2,500,000 acres in California and Arizona. The salient details of this scheme as outlined in a recent press dispatch are as follows:

Using the Glen Canyon dam for flood control, river regulation and storage, another dam would be built at the 1050-foot level below Diamond Creek to an approximate height of 700 feet. This dam would be solely for the pur-

pose of diverting the river and carrying it by means of a tunnel to the 1500-foot level, below Mellon and Topock, near the pinnacles of the Needles.

At this point the entire surplus flow of 22,000 second-feet would be divided between Arizona and California. The share of the former would flow through a network of canals to an extensive area now being surveyed. The 11,000 second-feet allocated to California would be brought to that state in the vicinity of the Needles. It would then fall in cemented canals through the Chuckawalla Valley, where it would provide water for lands now under cultivation. At Indio the water would be again divided, 4000 second-feet to run south to encircle the Coachella and Imperial Valleys with a sufficient supply to irrigate all lands now under cultivation. The other 11,000 second-feet would be taken in a tunnel from twelve to sixteen miles long under San Gorgonio Pass, to be finally distributed to lands on the coastal slope of Southern California below the 1400-foot level.

This project (though somewhat smirched by the backing of the narrow-minded ring of state politicians that has been responsible for blocking Arizona's ratification of the Santa Fe Pact) is a splendid dream. It has yet to be proven, however, that it is practicable from a financial, economic or engineering standpoint. It would, moreover, like any project advanced other than by a complete agreement of the Colorado River states, be fought relentlessly in the courts by the states of the Upper Basin; also by Mexico, which would be entirely cut off from a Colorado River water supply under this plan.

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DIRECTOR DAVIS AT DIAMOND CREEK DAM-SITE

THE COLORADO AT THE FOOT OF BLACK CANYON

Above—THE BLACK CANYON DAM-SITE
Below—NEAR THE FOOT OF BLACK CANYON

Returning to the railroad, we took train for Las Vegas, Nevada, where Mr. Davis left us to go direct to Black Canyon. The remaining sextette went by truck to the camp at Boulder Canyon, fifty miles distant, where a boat was purchased from the Reclamation Service for the voyage to Needles. As we rather expected to be on the mud a good deal of the way, Stabler, because he was Chief of the Land Classification Board of the Geological Survey, was made helmsman. He lived brilliantly up to his reputation, carrying his first-hand investigations to every rock, mudbank and sandbar between Boulder Canyon and Needles. Other menial labour, such as rowing, dish-washing, bailing and hunting the channel on foot, was shared impartially by the rest of us. Stetson, on the strength of having once broiled a moose steak in his native Maine woods, asked to be made cook. As there was no chance of getting any moose en voyage we acceded to his request only to the extent of allowing him to peel potatoes. Caldwell was allowed to cook one mess of a concoction he called "cornglomerate" before being permanently relegated to woodchopping. After that most of our eating was done direct from the cans.

The first day we passed through Boulder Canyon, visited the site of Old Callville and reached the Reclamation Service camp at the head of Black Canyon. Mr. Davis, who had preceded us here, showed us over the dam-sites in the morning. All of the more open-minded of us were a good deal impressed by the favourable conditions for construction offered by the towering walls of rhyolite, an impression which was

in no wise weakened when Mr. Davis made us a parting gift of the last hunk of ice in the camp. Two other dam-sites farther down the river were called respectively Bull's Head and Eagle Rock. As no one in the party appeared to have had sufficient zoological training to tell those animals apart, we never made quite sure which was which. With the latitude one has to allow in adjusting his imagination to the nomenclature of natural features, it is surprisingly easy to confuse the perked-up ears of a startled bull with the uplifted wings of a flying eagle.

Arriving at Needles on the fourth day, we bought the only pink candle and piece of angel's food at the Harvey House and had our parting function in the form of a party for Caldwell, whose birthday celebration on the river had been considerably marred as a consequence of the fact that we had allowed him to hash up another "cornglomerate." Stetson, who has a hunting lodge in the Maine woods near the Canadian line, contributed to the gaiety of the occasion with an imported bottle of ginger ale. The distinguished and debonair Secretary of the Colorado River Commission does far better as an importer than as a cook.

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Bereft of my amiable companions, I sought solace by having a fourteen-foot skiff hastily knocked together and pushing off down the river toward the Gulf. The fact that I passed Mojave Canyon in the grey of the dawn may account for my overlooking what has since come to be considered one of the most

favourable dam-sites on the Colorado. It is believed that a survey now being made will show that, for a given height of dam, this site in Mojave Canyon will hold up an even greater volume of water than dams at either Boulder or Glen Canyons. It has also been suggested that a comparatively low dam at Topock, practically on the site of the present Santa Fe railroad bridge, would give complete control of the river at a fraction of the cost of dams in the canyons higher up. Those favouring such a dam hold that its construction would be the quickest way of providing protection for Imperial Valley, allowing the problems of the development of the power of the middle canyons to be studied more thoroughly and settled entirely upon their merits.

At Yuma I picked up two passengers who joined forces with me for the purpose of finding out what had become of the Colorado River since it had been diverted from Volcano Lake by the Pescadero Dam. One of these was Ray Priest, Chief Engineer of the United States Reclamation Project at Yuma, the other Frank Higley, who had been in charge of the construction of the Pescadero Cut and Dam. The story of our strange wanderings through the mud and the mesquite of the Delta to tide-water of the Gulf of California has nothing to do with dam-sites and so is told in a chapter of its own.

PART III

BACK TO THE DELTA

CHAPTER I

TRAILING A LOST RIVER

THERE were two reasons why I was anxious to endeavour to take a boat through the mazes of the delta to the head of the Gulf of California. One was the opportunity such a trip promised to retrace some of the tracks of my early youthful jaunt to that colourful region, the other the chances it offered to find out what had become of the Colorado since it was turned back from its assault upon Imperial Valley by the Pescadero dam across the Bee and left to find its way to tide-water as best it might. One wondered how so proud and purposeful a stream as the Colorado would deport itself after so summary an ejectment. Had the beaten bull still kept going with his tail between his legs, as when last seen by the engineers who had herded him into the Pescadero Cut, or was he lurking in the jungles of the delta, licking his wounds in sullen anger and preparing for a fresh attack? The answer was undoubtedly written in letters of soft silt, plain for even one who ran to read; but because running in mud and tangled jungle was not easy, none had yet been able to decipher it.

Following the spoor of the maverick Colorado not only promised something distinctly novel in the way

of river navigation, but also seemed certain to reveal much of a vital character bearing on the threat to the Imperial Valley. To make observations on the latter score of any practical value it would be necessary to have a competent hydraulic engineer along, and it was for that reason that I first tried to recruit my party from among the several members of the United States Geological Survey with whom I had already boated down many hundred miles of the upper and middle river. When it proved impossible for any of these to secure extension of leave for the trip, I pushed off from Needles alone on the chance of signing on an adequate technical staff at Yuma.

The first inkling I had that the thirsty Valley of Imperial was draining the flow of the Colorado to its last dregs of red silt was at the Laguna Dam, over two hundred miles below the Needles. Here an old trapper told me that the dust was blowing from bank to bank of the river beyond Andrade and that I might just as well give up my plan of boating to the Gulf and sell my skiff to him for two dollars.

The superintendent of the dam confirmed the report regarding the complete diversion of the river into the Imperial Canal, but instead of a sacrifice sale of my skiff he recommended that I run it down the spillway after he had opened the gates and made an imitation Grand Canyon rapid. He had been in argument with some movie people who had filmed a Canadian Northwest logging-camp drama at the dam a few weeks before as to what would happen to a boat in the flooded spillway, and he welcomed the

chance to find out by practical demonstration. His own opinion was that while no open boat could avoid being swamped in the savage tumble of cross waves, the boatman ought to come out at the foot with no more than a rough rolling and a thorough sousing. It was true that a local youth, doubling for Milton Sills as the villain, had been drowned trying to swim the spillway, but that was probably largely due to the fact that he had a weak heart. If my heart was sound, the superintendent apprehended no serious trouble as a consequence of putting his theories to the test.

As both trapper and dam-boss impressed me as being just a bit inclined to turn the dried-up Colorado to their respective ends (as regards me and my skiff, that is), I decided not to forego my plan for a trip to the Gulf until its unfeasibility had been proven beyond all doubt. Portaging the boat on a push-car, I launched it below the dam and pulled on through fourteen miles of quiet, shallow water to the mouth of the Gila and Yuma. Here Project Manager Preston of the United States Reclamation Service, to whom I had brought a letter from Director Davis, assured me quite definitely that not only was the Imperial Canal taking all of the 3,500 second-feet of water in the Colorado, but that all of the waste of this was going to the Salton Sea by way of the channels of the Alamo and the New River rather than back to the parent stream. There might be two or three hundred second-feet of waste from the Yuma Project flowing down to the Colorado below

the diversion, but this, he thought, would be far from sufficient to make it possible for a boat to be navigated through the network of small channels into which the river had been directed by the Pescadero Cut. But Ray Priest, the Project Engineer, would be the one from whom to seek advice on that score. He had been fighting the Colorado floods for ten years to keep them from invading the irrigated acreage below Yuma, and was therefore vitally interested in what the river was going to do in the delta.

Priest declined to risk his professional reputation by venturing an opinion as to whether or not it would be possible to thread the mazes of the delta in a boat, but did something of far more practical value in volunteering to go along with me and find out. We discussed the trip at dinner that evening and then drove down to Andrade for the purpose of recruiting Frank Higley, the young engineer who had been in charge of the construction of the Pescadero Dam. How complete was the diversion of the Colorado at the Rockwood Heading may be judged from the fact that we crossed in the dark with dry feet a channel which, on one or two occasions, had carried floods in excess of 200,000 second-feet. Mrs. Priest, who accompanied us in evening gown just as she had risen from the dinner table, did not suffer the inconvenience of even the momentary miring of a satin pump. Good walking did not mean good boating, however, and the dryness of the Colorado channel augured anything but propitiously for the success of our adventure.

Higley, like Priest, reckoned that trying to boat down the bed of a river which didn't really have any bed for a number of miles was a good deal of a gamble; but one, however, in which he was anxious to have a fling. He would be only too glad to join us in an attempt to discover what had become of the Colorado after it had been thrown back from its attack upon Imperial Valley by way of Volcano Lake, and had no doubt that leave could be obtained from the head office at Calexico. He told us that the waste from the Yuma Project was being augmented slightly by dredging operations at Andrade, and expressed the opinion that the seepage from the spring overflow of the delta might amount to considerable in the aggregate. He suggested that instead of trying to drag the boat from pool to pool in the bed of the river below the diversion, we should take it by the district railway to Pescadero Dam and launch it at the head of the cut below. Between waste and seepage, he thought that as much as 300 second-feet might have returned to the river at this point. Confined in a single open channel, as it would be in the cut below the dam, this was all the water we would need, and some to spare. Divided into a score, or perhaps a hundred, trickling streams, each disappearing into impenetrable thickets of mesquite and *palo verde,* navigation could not but become complicated. A return on foot, with the abandonment of the complete outfit, would have to be seriously reckoned with, and—between bayous, soft mud and tangled thickets of thorn—even walking might prove highly difficult in places. Even so,

there was enough to be learned to make the attempt well worth while. Higley promised to go along and push us off at Pescadero Dam whether he was able to join us beyond or not.

Although the skiff in which I had come from Needles was originally built for but one man and a one-man load, Priest and I decided to use it in preference to a heavier boat on account of the greater ease with which it could be portaged or dragged through brush and mud. This argument was still decisive when definite word finally came that Higley was to go with us. That is to say, we figured it would be better to overload the boat where there was water than to overload ourselves where there was no water. This decision was a fortunate one so far as jungle navigation was concerned; when we came to buck the great tidal bore with a scant two or three inches of freeboard we had spells of regretting it.

For a short distance below Yuma the Colorado is still in a channel which must coincide fairly closely with that followed by Alarcon and Diaz, Pattie, Derby and Ives and the rest of the early navigators. The old channel followed down the eastern side of the delta all the way to the head of the Gulf. A decade and a half ago the Colorado broke away from its ancient course ten miles below Yuma and tried to win its way back to the Salton Sea by Volcano Lake and the New River. The Pescadero Dam across the Bee River deflected the Colorado back to the south, but whether any of it had found

its way to the former easterly channel again was one of the unread riddles of the delta.[1]

A low brown dredge-thrown ridge of sand marked the point where the Colorado lost its identity as a river and became a canal. It looked possible to run the boat through the chute under one of the gates of the Rockwood Heading, but knowing from experience that artificial barriers in water have a tricky way with them, I decided to suspend navigation temporarily at this point and make a jump by rail. A big steam crane sent out by Higley picked up skiff and load, deposited them on a flat car and carried the whole outfit down to the offices of the Imperial Irrigation District at Andrade. Here the boat was dropped on a car of the Pescadero Dam line, ready to proceed on the next stage of the journey behind a gasoline motor in the morning. Outfitting was completed during the afternoon. Provisions for two weeks were loaded, though with luck we hoped to get through to tidewater in less than half that time.

Chief Engineer Carberry of the Imperial Irrigation District had sent word from Calexico that we could count upon him to coöperate in every way possible, as he was greatly interested in knowing what had become of the Colorado after it had been turned back toward the Gulf. If we won through to La Bomba, the head of navigation on the Gulf, cars

[1] For a full account of the fight to keep the Colorado from returning to Salton Sea and submerging the Imperial Valley see *The Colorado River: Yesterday. To-day and To-morrow* Part II Chapters II and III.

would be sent by the road skirting the delta along the foot of the Cocopahs to bring us back. If we did not reappear at the end of a reasonable time, steps would be taken to know the reason why. Probably an aeroplane would be available for scouting. This was all very assuring on the score of personal comfort and safety, but it brought home to me for the first time that the high-water mark of Romance touched on my youthful expedition would never again be reached. I was no longer Ulysses seeking the Garden of the Hesperides, but only the companion of a couple of very able engineers searching for highly important technical data in a mud-submerged jungle, and against the undue loss of whose rather valuable time considerable precautions were being taken. And my Golden Land of Enchantment of a decade and more ago was now only the crest of a delta cone where the fate of a valley of ten thousand homes was to be decided.

With an incipient revolution brewing in Baja California, the Mexican border officials were suspicious even beyond their wont in the matter of papers, and especially gun permits. Thanks to the direct intervention of the District Office, ours were secured with less trouble than had been anticipated. Although the delta was no longer the wild-game paradise it had been in the days before Imperial Valley was settled, guns were still desirable. Bird life continued plentiful, and there was a rather persistent rumour to the effect that the crew of a rebel gunboat had taken refuge in the delta jungles after a demon-

stration toward Mexicali from La Bomba had proved abortive.

Breakfasting at six in the company dining-room at Andrade, we were off across the border in the early light of the grey October dawn. Higley's staff gave us a vociferous if somewhat bantering good-bye. With the broad channel of the Colorado, dry and bare from bank to bank, in full sight, it was hardly to be expected they could take our enterprise seriously. All were prolific of advice, perhaps the least frivolous of which was a suggestion that the boat be equipped with wheels and a supply of signal rockets be taken along. As a matter of fact none of us was confident that we would not be very glad of both wheels and distress signals before many hours had gone by.

Quail were calling to each other in the sage brush as the gate of the boundary fence clanged shut behind our cars, and the paling eastern sky was notched with pointed squadrons of southerly sailing geese. The line followed a low levee across a broad overflow area and headed directly for the point where the Pescadero Dam blocked a channel which had been carrying the main flow of the Colorado for over a decade. The dam proved to be a broad embankment of rock leading across to the right side of a straight leveed channel leading off to the south. This was the Pescadero Cut, excavated through the divide of the delta to give the diverted river an outlet toward the Gulf. Our voyage was to begin at the head of the Cut, in a clear, quietly meandering stream that was mostly made up of surplus water draining back

to the river from the irrigated lands of the Yuma Project. In volume it was but a fraction of one per cent of the great flood which Higley had battled the previous June to save the Pescadero Dam.

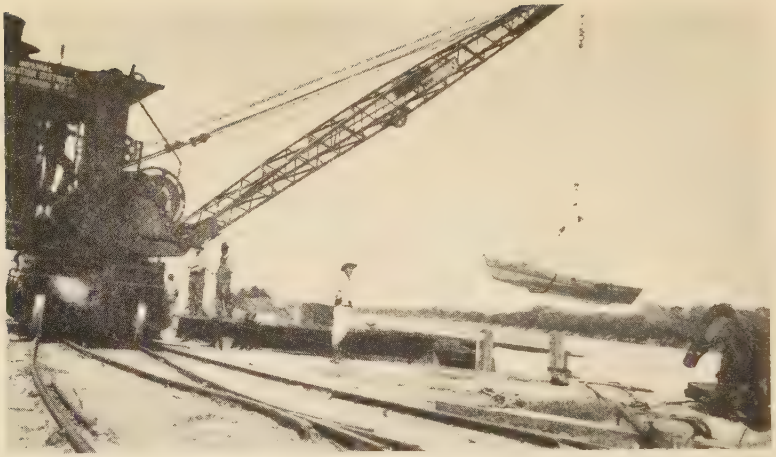
Sliding the boat down over the broken rock of the embankment, we launched and loaded it from a sand-bar at the water's edge. The little craft took a deal of trimming before everything and everybody was stowed, but we finally got her to ride sufficiently high by the head for rowing purposes by stowing all the load forward, Priest and Higley aft, and myself on the rowing thwart amidships. Any material shake-up of the crew was inclined to put the bow, stern or one of the gunwales under, but as we reckoned that most of our troubles would come while the bottom was being supported from below this did not give rise to serious apprehension.

There was something like a hundred feet of fall between the head of the Pescadero Cut and tide-water, Higley said. This was probably equal to two feet to the mile, or as much as the average declivity from the mouth of the Grand Canyon to Yuma. With that much fall and a clear channel all the way to the Gulf, the river could be kept flowing in that direction for many years. The trouble was that it was inclined to spread at high water and deposit its silt, thus gradually damming itself off and turning its waters back toward the Imperial Valley. Unless the river could cut a channel that would scour clear of silt, the diversion at the Pescadero Dam must ultimately become useless; but it was hoped that it would serve to mitigate the danger until a proper

Photo by U. S. Geological Survey

Photo by U. S. Geological Survey

Upper—THE PACOIMA DAM, FROM THE CALIFORNIA SIDE



Above—HOISTING OUT MY BOAT AT ROCKWOOD HEADING OF IMPERIAL CANAL

Below—THE START FROM PESCADERO DAM

flood-control dam was built in the canyoned section of the upper Colorado. The important point at the present moment was to learn whether or not the river, after being turned loose into the primeval bush below the Pescadero Cut, had begun to scour a clear channel for itself. If not, the old fight of raising levees fast enough to keep ahead of the rising silt table would have to be resumed. As soon as we left the artificial channel of the cut we should begin to get some idea of what the outlaw river had in mind.

There was a current of a mile or two an hour in the clearer reaches of the water in the bottom of the cut, and where there was room to use the oars we made good progress. Now and then we grounded, and here and there we had to get out and drag the boat over or around large piles of drift. The stream neither diminished nor augmented as long as it continued to flow between man-made banks, but where we reached the fringes of the Unknown at the end of the cut it did the very thing we had feared—divided into two parts, flowing in almost opposite directions. There was not much to choose between the diverging forks, but because that to the left appeared a shade larger and more open we turned the prow of our argosy in between its brush-fringed banks. At the end of a hundred yards a striking object lesson in the way of a river with a delta began to unfold.

On emerging from the excavated channel the floods appeared to have spread out through the mesquite in a broad lake-like sheet of slowly moving water. With its velocity checked the water had deposited

its silt very rapidly, and this had built up a new delta cone extending approximately at right angles to the course of the river to the Gulf. Instead of cutting a channel through the low spreading trees the Colorado had buried them. The trunks of the smaller trees had disappeared completely, with only their scraggly topmost branches indicating what was below. The new ground level had been built up ten or twelve feet in the course of what could not have been more than a few weeks of overflow. Indeed, surveys made subsequent to our trip showed an increase of elevation of thirteen feet just below the foot of the cut.

The tortuous channel into which we were headed had been cut when the water began to drain off after the height of the flood. Its sheer banks were of the newly deposited silt and its bottom was about on the level of the former surface of the ground. Here and there the caving banks revealed cross-sections of half buried mesquite. Such of the trees as stood in the channel had been cleared of earth to their roots, but most of them had served to anchor large piles of driftwood. As the channel narrowed these became increasingly troublesome as obstructions. At first it was only a matter of getting out and dragging the boat around the barriers, but as the water was decreased by successive forkings more and more places were encountered where it was necessary to cut through or lift over. This was slow and laborious work, and, with the treetops filled with great slabs of easily dislodged silt and drift, vilely dirty. The boat

would often emerge half full of earth and twigs from the tunnel cut for it through brush and drift.

Fork after fork was reached, each carrying off a trickle from our dwindling stream. In every case we tried to pick the largest and least obstructed, but at the end of a mile from the foot of the cut the best we had in the way of the main Colorado was a ten-foot-wide stream that was all but completely blocked by trees and brush. It had become smaller than many forks we had passed by, but as it was probable that all of these latter would continue to divide it was not thought worth while to try to work back to them. It was no longer possible to ride in the boat for more than a few feet at a time, usually in the little lagoon backed up behind a pile of drift. At the obstructions one man chopped continuously with an ax, while the others dragged away the debris and worked the boat ahead. Priest almost severed a toe when a deflected blow with the ax landed on his bracing foot, but insisted on continuing with his work after binding up the cloven shoe with a piece of rope. I have known men to lay up for a week with a lesser cut.

The last quarter of a mile before we stopped for rest and lunch took us an hour to cover. Progress was equally slow until mid-afternoon, and then the almost solid mass of brush ahead defied all further progress by the channel we had been following. It really looked as though there was nothing to do but take what we could on our backs and start working out of the maze on foot. Quite apart from the dis-

appointment of failure at so early a stage, this offered far from an alluring prospect. We had passed places where we could have come more readily on foot than by boat, but there were just as many others where it was by no means certain that progress was possible by any other means than a boat. Before putting the practicability of retreat to a test, therefore, we decided to scout for other possible channels of advance.

On climbing out to the sides we found that the banks were lower and firmer than above. This, as we presently discovered, was due to our having passed through and beyond the newly deposited delta cone. There had been a scouring out of the earth here rather than an upbuilding of it; the tendency had been to undermine rather than to bury the trees. This indicated that there was a considerable slope to the terrain, and promised well-scoured channels if only they could be located.

Our search for opener waterways was successful beyond all expectations. Priest, circling to the left, came up on a good-sized stream inside of a quarter of a mile. On the right Higley and I came up on two others within a few hundred yards. All of the water we had lost above appeared to be converging upon some point not very far below. The portage to the nearest stream on the right was a back-breaking piece of work but we made it, with both boat and load, in little over an hour.

The stream upon which we relaunched the boat flowed over a bottom of adobe and twisted willow roots. The water was crystal clear and tumbled

along at a rate of five or six miles an hour. Where it was deep enough to float the boat we made good time, but frequent stops were necessary to cut away dead trunks and lift over shallows. The fact that the course was bordered with willows, many of them of considerable size, was a most encouraging sign. It meant that there had been some kind of a runway here for many years, and that we were probably at the head of one of the networks of drainage channels of the Pescadero.

Streams coming in from left and right within the next half mile gave us a flow of possibly fifty second-feet, but most of the benefit of the augmentation was lost when we ran into a sort of willow swamp through which a channel for the boat had again to be cut with the ax. The mud was almost bottomless here and in places it was impossible to extricate one's feet without a tree or the boat to give a supporting hold. The waters collected again into a firm-bottomed channel below the swamp and, bumping back and forth from bank to bank, we ran swiftly down to come suddenly upon one of the strangest sights I ever beheld.

As far as ocular evidence went we had literally run from summer to winter in the wink of an eye; from tropic to arctic at the turn of a bend. One moment we were running through a leafy tunnel of golden green, the next bearing down upon an astonishingly good imitation of a field of melting snow. Indeed, had the boat been suddenly drawn into some unexpected side channel, so that the first startling glimpse of the vista ahead had also been the last, the mental

picture remaining might well have been characterized as an impressionistic sketch of "Old Orchard Under an Early Snowfall," or something of the kind. An instant later, however, when the bow began to plough into the first "snowdrift," we were able to diagnose the illusion as a sheet of foam-white water tumbling under a grove of mesquite. The snowiness of the agitated water no less than the uniformity in size of the trees, and their shape and the orchard-like evenness of their setting, was responsible for the strange illusion. The impression of frigidity was further enhanced by a wall of enormous willows whose branches were thick laden with "pussy" florescence, fluffy white with a tinge of pink from the sunset glow.

Under the spreading mesquite the water splashed and rippled the high-pitched song of a noisy brook, but from where the white sheet dropped out of sight ahead there came a deeper-toned note that warned of a sharp descent. It was plainly in order to halt our speeding craft without delay. With no room to use the oars, there was nothing to do but resort to more direct and primitive methods of control. Tumbling overboard with the stern-line, I was reassured to find the bottom hard and the water surging but a few inches above my knees. That was my first impression. The next had to do with a thumping wallop at about the line of my belt and the swish of a cold current over my ears. When I got my head above water it was to find my floundering anatomy jack-knifed around a mesquite trunk, with the boat afoul of another tree just below. The bottom, while

hard, was infernally slippery. Also, the hard-running current proved to have more power than I had expected. As the boat had been checked before reaching the edge of the fall ahead there was nothing much to complain about. The wetting was all in the day's work, though the middle of October was a bit late for an "all-over."

Wading carefully to the right bank after securing the boat, we circled down behind the fringing willows in an endeavour to learn what we were running into ahead. The roar we had heard from where the snowy carpet beneath the mesquite dropped out of sight proved no false alarm. A cascade of solid water with a fall of from six to eight feet over the gnarled roots of willow and mesquite plainly had a real kick behind it. A boat caught side-on in the serpentine chute might easily upset and possibly be smashed. There was little threat once the dangers were understood, but it was certainly not a place to run into blindly.

Below the falls we came to a spot as enchantingly beautiful as that above was weirdly bizarre. Into a great swirling willow-bordered pool of perhaps fifty yards in diameter another stream equal in volume to that which we had been following came tumbling. Sparkling in crystal clearness as it poured over roots and fallen logs, it seemed to belong more to the Canadian Northwest or Alaska than to the heart of the delta of the Colorado. Through the masking barrier of verdure the glint of the waters of a third stream was revealed still farther to the right. Evidently all of the water that we had lost since emerg-

ing from the Pescadero Cut was returning as to some common rendezvous, probably an old-established channel. This boded hopefully for our continued progress, though it seemed too much to expect that the scattering operation would not be repeated wherever the next blockade occurred.

The leafy arcade of the overhanging trees cut off all but a few broken patches of the flushed evening sky, but the autumnal hues of the foliage, like the stained glass windows of an old cathedral nave, allowed mellowed light motes to filter through to play upon the dancing waters beneath. The swirling pool where the waters met was a pot of red, raw molten gold, alchemized from the reflection of the yellow leaves of the overarching branches above. The glow of the air was almost palpably warm, strangely suggesting the bright sunlight of midsummer. There was the lucent green of early spring in the rippling waters beneath the cottonwood and *palo verde* shading the right-hand fork, the coldness of full winter in the ghost dance of the frothing currents swirling through the mesquite blocking that to the left. Below, where the trees of an ancient forest of willows were packed almost solid with cottony fluff, the shell-pink flush where the dying sunlight was reflected through the upper branches deepened to a misty purple on the quieting water. The cavernous depths of the tunnel where the stream penetrated the obstructing trees had already taken on a slaty black.

As the peninsula between the two converging streams offered as open and as dry a camp-site as there was hope of finding we decided to stop there

for the night. While Priest built a fire and tied up his cut foot, Higley and I prepared to take the boat down the fall. This was bound to be a wet passage however it was effected, but by running through that night it was figured we would be able to make a dry start in the morning. As the important thing was to prevent the boat from being swung beam-on to the current and capsized, Higley was stationed on the bow to fend off trees while I waded down along the bank with the stern-line.

As might have been expected, I lost my footing the moment the boat dipped over the brink of the cascade, and so made most of the run floundering at the end of the stern-line. All went well notwithstanding, that is, until one of my dragging feet caught in the bight of an undermined root. The mesquite root, though soft and flexible, has all of the toughness of a wire cable, so that it was probably just as well that the line slipped from my grasp before much of a strain was put on either the rather light stern of the boat or my ankle. The boat and I made the rest of the run separately, neither of us shipping enough water to do any harm. I found the middle of the big pool a good deal over my head. The bark of the whirlpool where the two streams joined, however, was much worse than its bite. A few strokes carried me to an eddy from which it was easy wading to where Higley had tied up the skiff below our camp.

Mosquitoes were sufficiently numerous and attentive to make the grateful shelter of a smudge entirely welcome while cooking and eating supper, but by the time we were ready to roll into our blankets the

chilling air had completely quenched the ardour of these most troublesome tormentors. Priest's cut foot kept him awake most of the night, but did not prevent his reporting for duty in the morning.

The chill of a dew that was almost frost drove us out at daybreak to seek the warmth of a camp-fire, but we delayed pushing off for an hour after breakfast to gain the benefit of the stronger light for some photographs of what we had come to speak of as "The Meeting of the Waters." There is curiously little in common between Tom Moore's "Sweet Vale of Avoca" and this unknown and unsung corner of the delta where the de-silted waters of the muddy Colorado reunite in a veritable bower of sylvan loveliness, yet the one is not more worthy than the other of those lilting lines of the Irish poet:

> "There is not in the wide world a valley so sweet
> As that vale in whose bosom the bright waters meet."

The dense canopy of the trees cast heavy shadows on the streams even after the sun was well up, so that all of my exposures had to be of two and three seconds or more. This dulled the life and movement of the sparkling waters, but even so, much of the strange haunting beauty of the place was caught by the films. Slowest of all the exposures were those made where the white sheet of broken water swept down to the head of the fall through the mesquite, yet even these preserve much of the illusion of the "Old Orchard Under an Early Snowfall."

There was room, as there was need, to use the oars

in crossing the big pool where the streams united, but as the boat drifted on down to where the water disappeared under the great grove of old willows we seemed to be approaching an impenetrable barrier. The huge trunks of the ancient druid trees were scattered at considerable intervals—quite sufficient to allow the boat to pass between them and under their widely spreading lower limbs. It was the thickset younger growth between that threatened to bar the way through what we now found to be an almost currentless swamp.

The snow-laden Christmas-tree effect was even more striking under direct sunlight than by the subdued glow of eventide. Spangled with dewdrops, the snowy fluff strained all the glare from the sunlight and allowed only a soft fluid radiance to filter through to illumine the druidical caverns under the arching branches and shed a ghostly green-white glow on swaying beards of pendant moss. Overhead, where the masking whiteness thinned, glowing blurs of golden light dissolved in kaleidoscopic halos that were strangely suggestive of the elusive sun-dogs that play hide-and-seek in the early morning mists over arctic waters.

After setting up my tripod and taking a couple of pictures from an annoyingly unstable mud-bank, we climbed into the boat again and pushed on into the maze below. The first solid collision with the trunk of one of the old trees produced a veritable transformation scene. There was a half-minute snow flurry in yellow calcium, and when it was over the sun was shining brightly down on a patch of

river carpeted a foot deep in cottony fluff. The dying florescence, weighed with dewdrops, had been ready to fall at the touch of a hair; and the impacting of the nose of the boat upon the trunk of the tree was something more than that. Smeared with black mud as we were, shoulders and legs gave ready adhesion to all the fluff that fluttered their way. One moment we might have passed for slaves hiding in the Dismal Swamp, the next for something between Santa Clauses and escapes from a Texas tar-and-feather party. The stuff washed off readily, but after finding that every fresh contact with the trunk or limb of one of the large trees brought down a fresh shower further restorative efforts were postponed until we were out of the woods.

The swamp, though hard navigating with the boat, proved far from impassable. The more slender of the younger growth bent down readily, the heavier yielded to Higley's vigorously plied ax. The mud, two feet deep and overlaid with about the same depth of almost stagnant water, was the worst trouble. Every time one lifted hard on the boat his feet were buried so deeply that he had to have help to extricate them. Once all three of us were bogged at the same time, while the boat drifted on across fifty yards of open water before grounding. Our hardest work was where the swamp broadened out and shallowed at its lower end. Here there was not more than three or four inches of water for a considerable distance, across which the boat had to be tugged and shoved through clinging silt. Portaging on firm

ground would have been vastly easier, but at this time there was nothing but swamp in sight.

Winning through finally to a ridge of firm adobe we found ourselves again in a narrow channel filled with clear, swiftly flowing water. The banks and bottom, mostly of matted willow root, showed very little evidence of destructive erosion. In a stream of considerably greater volume than any followed above we banged along merrily for nearly a mile without encountering any obstructions formidable enough to make us get out of a boat. Then, in slackening water, we drifted down to a large mass of driftwood filling the channel from bank to bank. The core of it appeared to be formed by an old beaver dam against which the drift of later overflows had piled.

With no chance to get the boat out for a portage, the best alternative seemed to be the only partially clogged chute where most of the stream shot under the end of the pile against the left bank. As Higley cut away the obstructing brush and log-ends, Priest, braced against a tree on the bank, paid out the painter and let the boat down foot by foot as the way was cleared. Astride of a log at the lower end of the chute, I waited to ease the boat on through or to salvage wreckage in the event of an upset. It was an awkward hole to work in and we were fortunate in getting past it with nothing worse than a few buckets of water shipped when the skiff fouled a log at the end of her run.

Pushing off below the jam, we found the stream was swifter than above, and tending to accelerate in

velocity with a pronounced increase in fall. There was little room to use the oars but quick fending with poles kept the boat from protracted groundings. We were bowling along at a good six or eight miles an hour when the sound of tumbling water ahead warned that it was time to look for a landing. Priest was about to jump out with the painter when a rounded bend revealed that the booming cascade, though steep and of considerable fall, was open and fairly well covered with water. Calling to Priest to hang on, I gave a push with an oar and sent the nose of the boat straight down into the head of the foaming chute. I have had many a quieter run even in the Grand Canyon itself.

It is not a good practice to ignore the punitive potentialities of even a rapid of roots and clay. I had overrated considerably the depth of water in the fall, as I found when the bow banged down hard on a hummocky mound, hung, and allowed the stern to be swung round and take the lead. The rest of the passage was a good deal like the stairway waltz in one of the popular musical comedies of a decade ago. Now the boat would turn two or three times one way, now it would reverse and go the other. Luckily, both bow and stern did not ground solidly at the same moment, else skiff and crew could hardly have failed to start a rolling free-for-all.

There had been no time to see what was unfolding ahead while we were bumping-the-bumps, so that it was with a thrill of real surprise that we found the boat gliding out upon the mirror-like surface of a quiet, deep channel winding in from the right on a

southerly course. Deeper than the length of an oar in the middle, nearly a hundred feet in width, and with high banks which sloped up sharply to an overhanging wall of willow, cottonwood and mesquite, the meandering river recalled at once the still fifty-miles-distant Hardy which I had followed down to the Gulf many years before. It was plainly a part of the Pescadero drainage system and had doubtless carried the main flow of the Colorado many seasons during the periods the great river had found its way to the sea along the western and central sections of the delta. It appeared to have a flow greatly in excess of the 250 second-feet Higley had estimated as that in the Pescadero Cut, but this was only a surmise. Having no accurate cross-section of the channel it was impossible even to approximate how much water it was carrying.

From the depth, breadth and openness of the river it did not seem unreasonable to expect that it would lead us right on to tide-water—that the brush and mud work was all over. Determined at least to reap full advantage of the open going while it lasted, we started to take turns in brisk half hour shifts at the oars. In less than a mile we entered a channel still broader than the one we followed. It came from our left and wound off to the right in a general southwesterly direction. It averaged 150 feet in width where we pulled into it, and had broadened to nearly twice that three miles below when we came to an abrupt ending of it in a flat of caked mud.

For a few minutes it looked as though we were in a lagoon which, like Great Salt Lake, had many

feeders but no outlet. Then the movement of a piece of drift led us to row back a few hundred yards to where a long line of water-scoured logs was piled up against the bordering row of trees. At one point here we were drawn into a strong outpouring current disappearing under the piled logs and sharp pulling was necessary to prevent the boat from being sucked against the barrier. This one outlet appeared to be taking care of all of the present flow of the river, though evidences of openings scoured by higher water occurred for a quarter of a mile above and below. That we were faced with another stretch of jungle navigation was plain in any event.

As it looked impossible to penetrate any distance across and beyond the log jam even on foot, starting a portage with the boat in the immediate vicinity was out of the question. Our best chance of finding an open water course again appeared to be to follow one of the only partially overgrown channels where the flood had escaped at a slightly higher level. Before running the risk of entangling the boat beyond hope of extrication we decided to reconnoitre ahead. If the river continued to flow under logs and closely tangled brush for any distance continued progress with a boat was out of the question. A half mile through such bush as that at the jam would resist the passage of the skiff for a week, and we reckoned it was still fifty miles to tide-water.

Entering the forest by a dry channel near the end of the lagoon, we were greatly encouraged to reach a stream of clear, swiftly flowing water in little over a hundred yards. Following this back toward its

source, we found that it carried about two-thirds of the flow escaping from the lagoon under the log jam. The other third drained off in a channel flowing almost directly south. As the larger or right-hand fork looked fairly open for the few hundred yards explored, we decided to chance it with the boat. The cutting away of a few young willows opened the way for a portage, which was completed inside of an hour.

The stream into which we now pushed off appeared to have a considerably greater volume than any we had followed above the lagoon. For a half mile there was room to steer with the oars most of the way, with plenty of water for avoiding snags and drift-piles. Then, at the end of a hundred yards of slack water, we came to another log jam forming a complete and solid barrier. In form it was much like the one at the beaver dam above the upper end of the lagoon, only much larger and with a considerably greater fall of water through it. It was the weight and power of this tumbling water that made the job of opening a channel with the ax one not lightly to be courted. With much of the drift plainly in a state of unstable equilibrium there was always the chance of cutting through or dislodging a "key" log and starting the whole jam and its impounded lake on toward the sea.

Higley insisted on continuing his job as chief chopper, and Priest and I, with reiterated cautions as to letting neither himself nor the only surviving ax fall between the logs, allowed him to have his way. The axeman ran rather more chance than the others

of tangling himself up with the jam in case it gave way, though in the event of a general break-up it was hardly likely the logs were going to play any favourites. As before, Priest let the boat down from above as the way was cleared, while I stood by to catch whatever came out below. The chute by which I was stationed, though not over six feet in width, had a terrifically swift current and was very deep. Both times I fell into it I found myself in the pool fifty feet below in the wink of an eye without touching either the bottom or the sides.

The power of the water surging under the jam was evident from the way it kept snapping logs only partially cut through by Higley's hard-plied ax. Considerable quantities of drift and debris came down each time a supporting log was severed, but not until the channel was almost cleared did the main pile begin to show signs of restiveness. Shiverings, crunching and a slight subsidence were warnings too ominous to go unheeded. Rather than run the risk of cutting what might well have proved to be the key log locking the jam in place, we decided to trust to the strength of the current to force the boat under the last ten feet of timbered tunnel giving to the open chute below. The logs were high enough above the water to give clearance if the skiff could only be kept from swinging sidewise. Swinging meant an inevitable capsize, of course, but even in that event we figured that most of the floatables could be salvaged from the eddies below.

Lashing the load in the bottom, Higley and Priest lined the boat carefully down over the cascade in the

opened channel. Holding the bow upstream, they paid out the painter until the stern ran squarely into the mouth of the tunnel and then turned her loose. An instant later the little craft flashed by me with the speed of a torpedo and on into the quiet water under the left bank. I had planned to grab the stern as it appeared, ease it in to the bank and ride through to the pool below. I could as readily have mounted the back of a plunging porpoise, so it is probably just as well I did not risk an upset by trying it. When I waded out to where she waited in the eddy it was to find that the run had been made without shipping a spoonful of water or knocking down a handful of rotten drift. This was real luck, coupled with good judgment on Higley's part, in clearing a way into the jam and starting the boat right for its run through the tunnel.

It was below this jam that, for the first time, we began to notice fish jumping in the swift-flowing water, one of them landing in the boat as it was bumping down a root-formed riffle. Yellow fins and gills and a silvery suit of scales marked the little visitor as a probable member of the perch family. Coming from cold clear water it promised to be highly edible—a really appetizing fryer. We were just putting our heads together to devise a plan for catching a mess of fish for supper when the drifting boat grounded on the bar between two diverging streams, hung up, so to speak, on the horns of the dilemma as to which was the proper course. Evidently our river was going to start leaking away again.

We turned down into the larger channel to the

right, but this divided and subdivided so rapidly that at the end of half a mile we were stopped dead against a wall of brush and driftwood. We located three places where little streams were sneaking away into the jungle on the quiet, and only one of these had enough water to float the boat. Several logs had to be cut away to open the head of this channel, after which the trouble was mostly with low-hanging brush. Young willow growth was easily pushed aside or cut away, but the thorny mesquite was inclined to fight back. Higley and his ax had something the best of the argument, Priest and I rather the worst. Priest took his punishment quite stoically, but my nerves and temper must have been frayed about as badly as my shirt before we came to opener going.

After a half hour of chopping, tugging and shoving, we won through to a pool where the first of the renegade streams came slinking unobtrusively back. A little below another returned to the fold and from there on navigational obstacles were less frequent for a while. Here and there were stretches where wheels would have been some help, but most of the time there was water enough to carry the skiff with only an occasional fouling of a root or snag. Bumping along until the difference between mud and water was no longer discernible in the fading autumn twilight, we camped for the night where the stream divided at the head of a long narrow island and many stranded logs insured a roaring fire. According to the course plotted by Priest and Higley we had come eight miles since morning, about half of it through badly obstructed channels. Considering the char-

acter of the obstacles, this was highly encouraging progress.

After a quarter of a mile the next morning returning streams came bounding back at almost every bend. Most of these carried water that had broken away above, but here and there considerable seeps came from extensive ponds left from the June overflow. The channel we followed became deeper and more open as its volume augmented. With only the occasional prod of a pole or the slap of an oar we averaged a good six miles an hour all the early forenoon. The speed of the stream increased with the slope down which it ran—probably the side of an arm of the delta cone.

Such easy and exhilarating navigation seemed almost too good to continue, and it was with less surprise than disappointment that the sudden looming of a big pile of drift appeared to signalize the end of it. The absence of slack water indicated that the stream was not completely blocked, and when the rippling song of the latter sunk from a treble to a rumbling bass it appeared that the escape was effected over a considerable fall. The skiff sucked hard against the logs where a part of the stream ran under the drift-pile, but with most of the water surging back and round to the left it seemed worth chancing a run through. Clearing the end of the obstruction, the boat teetered giddily for an instant on a verge of intertwisted roots and then went bumping down a foam-white cascade to a violently agitated pool below. Through the sun-shot mists ahead a second stream was discerned leaping forth from the bosky

depths of the forest and tumbling down a terrace of mossy steps to mingle its flow with that of the one by which we had come. We had arrived at another "Meeting of the Waters."

The difference between the upper and this lower rendezvous of streams was mainly one of atmosphere. There the nuptials were solemnized in the dusky nave of an old cathedral, a cold place of subdued lights and brooding shadows; here they were celebrated in the rainbow-bright sunlight, with a flashing gaiety of colours and attuned to the note of carnival. Yet for natural beauty one was not less lovely than the other.

The cascade had a fall of perhaps ten feet in fifty and was open enough to make the run a thing of excitement rather than risk. The flash of leaping fish laced the air with a silver network all the way down. One quivering crescent of brightness cleared the gunwale and landed against my bare foot as the plunging bow scooped out a pool half way down the cascade; a second flopped into Priest's lap as the boat shot through the rainbow arching above the mists at the foot. Solid green water came over the side as we plunged into the fountain where the tumbling waters coiled and swirled in their first embrace; then the boat was shot across the pool and into a swift, evenly flowing chute draining down to a smooth, quiet channel leading away to the west.

The waterway in which we now found ourselves was narrow, deep and comparatively open. Its steep, evenly sloping banks and comparative straightness made it seem almost like an artificially excavated

canal. Room and occasion to use the oars came with a broadening section and a slackening current. After pulling for a little over half a mile we came out upon a broad lagoon, a winding stretch of water apparently very similar in character to that which we had navigated for four miles above the great log jam. Its general direction was north and south, with only a slight but perceptible current indicating that it drained in the latter direction. After a careful study of his maps Higley announced that this was undoubtedly the upper end of the deeply scoured channel of the Pescadero drainage area of the delta and that we were unlikely to encounter further obstructions between there and tide-water. This subsequently proved to be the case.

The prime object of our trip had been accomplished. We had set out to learn what the Colorado had done toward making a way for itself between where it was diverted from the old Bee channel at the Pescadero Dam and where it found open going to the Gulf. We had seen how the river had broken through, but only after the last pound of silt had been strained from its waters to augment the already dangerously pyramided delta cone. We had found indubitable evidence that the engineers protecting Imperial Valley had won the first round of the renewed fight, but we also saw how vitally important it was that they should continue preparations for the rounds to follow. We learned, in short, that while a lengthening of the Pescadero Cut, the raising of levees, and perhaps a dynamiting of some of the log jams, can be counted upon to keep a southerly drainage

channel open to tide-water, the only certain way the menace to Imperial Valley may be removed for all time is by a flood-control dam in one of the canyons of the middle Colorado.

CHAPTER II

DOWN TO THE SILENT SEA

I HAD told myself from the outset that the point where sea-tide vanquished river-tide would be the logical place at which to bring my voyage down the Colorado to a finish. This had come to pass where the high mud banks of La Bomba caved under the onslaught of the great bore from the Gulf of California. Seventeen hundred miles of the river were behind me; ahead were only the salt waters of an arm of the Pacific. With nothing further to draw me on, I gave my boat and oars to the very engaging Mexican mate of the sloop on which we had ridden out a couple of charges of the bore and returned to Calexico by land. There I was reminded (what I really knew all of the time) that there was still a hundred miles or more of the lower Colorado which I had failed to navigate: the deeply-scoured channel of the Alamo down which the ancient river had discharged to the below-sea-level depression of Salton Sink.

At the office of the Imperial Irrigation District I learned that the upper section of the old Alamo channel now carried the main supply canal bringing water from the Colorado to the valley. The lower section, from a few miles south of the Mexican line to the Salton Sea, was utilized as a "waste." It received the excess supply from the main canal and the

surplus draining back from the irrigated fields. The canal—now carrying the whole flow from the Colorado—would be easy enough to navigate if care was taken in approaching headings and "checks," around which a boat would have to be portaged. The section from the boundary line to Salton Sea would be another matter. It had a minimum flow of about 500 second-feet at the present, and this might be doubled or trebled over night in the event of a sudden rise in the Colorado. This stream, for most of the way to Salton Sea, flowed at the bottom of a deep, sheer-walled gorge scoured into the soft silt of the valley floor. With a fall of four or five feet to the mile, it was far swifter than any part of the main Colorado below the foot of the Grand Canyon.

That was about the extent of the definite knowledge of the lower Alamo at District headquarters. Although crossed by bridges at many places and blocked by dams at two points, little was known of the channel in the long stretches between. For most of its length there was a narrow zone of unreclaimed land on either side of the gorge, forming a winding strip of desert all the way across the valley. There was no record of anyone having boated down the channel since it had carried the whole flood of the Colorado in the overflows of 1905–06. There would be no trouble on the score of water, I was assured; in many stretches the stream was probably deeper than it was wide. The principal difficulties would arise from the encroaching brush, the low-hanging timbers of bridges, obstructions thrown in to prevent the cutting of banks, and possibly from barbed wire, both above

and below the water. There would be no difficulty in portaging at the dams; the trouble would come in avoiding brush and barbed-wire entanglements suddenly encountered between sheer banks.

One of the District engineers thought that getting out of Salton Sea might also present something of a problem. Reaching the great sink at all by way of the Alamo would be hard enough, he said; finding a place where the mud shores were firm enough to allow one to wade out to *terra firma* would be harder still. Of this he was certain, for the District had tried for many years to find a place where the water could be approached near enough to erect a suitable gauge to register rise and fall. The upper stratum of deposited silt was so light that one could hardly tell by touch where it left off and the water began. The shores of the sink were level for miles, so that a brisk breeze off the sea would drive the water in a thousand yards as fast as a man could run—run on hard ground, that is. The mud itself was all but bottomless. Wading was out of the question. The only way one could progress in it was to lie down and swim. Strange as this sounded, I knew it to be literally true. That ancient head of the Gulf of California has a number of funny little tricks that are all its own. Chasing a man with wind-blown water is only one of them.

Alluring as was the prospect of bumping down in a boat to a depression far below the level of the sea, it was evident that a certain amount of looking before the leaping was very much in order. One of the irrigation engineers on his rounds showed me about

all that was to be seen of the Alamo from the roads. In the course of a day's drive we crossed the deeply worn channel in perhaps a dozen places. Its salient features were very similar in almost every instance—steep walls from twenty to fifty feet in height being constantly under-cut by a fierce narrow torrent of dirty water. Trees, willow and mesquite, grew close to the water's edge all along. At places the stream tumbled along in a leafy tunnel; at others undermined and fallen trees appeared to block it all the way across. Dangling ends of barbed-wire fences reinforced some of the obstructions and threatened to complicate the problem of getting through or by them. Most of the bridges gave a sufficient clearance for a boat at the present stage, but at two or three, where there was no chance to land to reconnoitre, it looked like close shooting. With any material increase in the flow of water entering the "waste," a certain amount of bumping at the bridges would be inevitable. We did not visit either of the dams, as help for portages was assured at both.

Conditions at Salton Sea were a good deal clearer than those along the river. A survey from the outlook on Mullet Island revealed the situation at a glance. This "island" is a strange volcanic formation that has not been surrounded by water since the Salton Sea was at its highest stage a number of years ago. A mile of apparently dead level marsh stretched from its base to the present stage of the great desert sea. A westerly wind drove the water in across the marsh right up to the island; an easterly wind backed it off toward the distant wall of the San

Jacintos and uncovered another mile or two of mud flats. To the south and southwest a five-mile-distant line of willows marked the course of the Alamo. A boat could enter the sea by the river but probably could not return; the current was too swift to row against, while the mud was too soft to permit towing or poling.

A chap calling himself Captain Davis, who occupied the island by squatter's rights, suggested a possible solution. Pointing out that the criss-cross of low dykes he had thrown up to impound water to attract the ducks covered the marsh to the edge of the sea, he said that he thought that he could devise a way of planting a line of poles for another quarter of a mile, and that these, roped together, would offer a means of towing in a boat through the soft mud. He had been getting the stuff together to try the thing on his own account. If I would come down and get out into the sea, he would hurry and rig the thing up so as to take advantage of the chance to try it out. Asked what would be the alternative if the "thing" failed, the Captain opined that maybe some help would be got from the winds. If there was a strong west wind, the water might be piled in high enough on the marsh to let me bring my boat right up against one of his dykes. If it was a nor'-easter, on the other hand, the thing to do would be to scud before it and try for a landing where the surf rolled in against the rocks over on the San Jacinto side.

Trying to weather a desert gale on Salton Sea in a small skiff had no appeal to me; nor did I have any

great faith in Davis' plan for stringing a "life-line." In telling him that he might expect to see me come fluttering up out of the seaward mirage at the end or four or five days, I think there must have been a feeling in the back of my head that, in a pinch, I could contrive to work a boat back to some sort of a feasible landing at the river entrance. In any event, I decided to take the chance. Davis was striding off, shovel on shoulder, to begin work on his pole-line as we drove away.

One thing was clear from my tour of advance exploration: the lower Alamo, with its dams of brush and driftwood, its low-hanging bridges and its barbed-wire entanglements, was no place for a boat with a one-man crew. There were sure to be as many obstacles as we had encountered in following the main Colorado through the primeval jungles of the delta, with a much greater average fall and a more concentrated weight of water to deal with. Priest and Higley, the two engineers who had helped me fight through to the Gulf, would have been ideal companions for the present voyage. Both expressed great interest in the trip when I called them up by 'phone, but neither was able to leave his regular duties at the moment. Higley had in mind a boat which he thought would do, and promised to have it dug out of the mud and repaired at once. The engineers of the Imperial District were a unit in desiring to sign on for a voyage that promised to yield much data otherwise unobtainable, but the fact that consolidation of the several water companies of the Valley was about to be effected made it necessary for them to

stand by at headquarters. After a call for volunteers in the local papers had failed to produce results, I decided to make the start alone. The canal section of the run would be easy going in any event, and possibly hands could be recruited along the way. There would be time enough to worry about a shortage in the crew when I portaged down into the Alamo waste channel. With which comforting reflection I sorted out a light river outfit and took train for Andrade, at the heading of the Alamo Canal.

The boat which had been reconditioned for my use turned out to be a flat little tub of a dinghy that had been the tender of a dredge before an early summer's flood had carried it away and buried it for a season or two under a bed of soft silt. Its pine sides and bottom had become a bit soggy from its long mud-bath, while the stern and one or two planks had been loosened in the somewhat drastic process of disinterment. Higley had ordered a new stern and a liberal caulking and tarring. The job had been completed a few hours before my arrival, and the boat put back in the canal for a thorough soaking. As we walked down to look it over the carpenter assured me that he was certain that every leak was stopped and that we would not find a drop of water coming in. This optimistic forecast proved quite well founded, in a sense. Not a drop of water was coming in, and for the very good reason that there was not room for another drop. The skiff was on the bottom, with only its painter and the ring in its nose showing above the surface of the water.

A hurried bailing disclosed not a single leak that

one could put his finger on and caulk, but rather an all-pervading seep through the soggy planking. Only the new boards seemed to interpose an effective bar to the passage of water, and the junction of these with the old was more than precarious on account of the inability of the latter to grip a nail. My argosy was decidedly sick, and with a deep-seated malady. Tar might have been a palliative but not a cure. For that more drastic remedy was demanded. Mixing several buckets of sand and cement, we poured an inch-thick floor of concrete from stem to stern of the yielding bottom. Giving this a couple of hours to set, I threw in my outfit and pushed off down the canal.

I knew better than to let my mind dwell upon the considerable vista of possibilities opened up by the fact that my inspirationally devised all-stone bottom had converted my boat to a heavier-than-water craft —one that could not possibly float unless kept right-side-up. That was all the more reason for avoiding chances of an upset, and to that end the two hundred pounds or more of concrete could be counted upon to act as ballast and give increased stability. For the moment it was enough to know the boat floated, that it had ceased to leak, that it responded readily if somewhat wallowingly to the oars, and that, with my light outfit, it still had a fair amount of freeboard. With nothing but smooth water ahead for the next sixty or seventy miles, what more could young Ulysses ask? Falling into an easy stroke I abandoned myself to that *carpe diem* mood and pre-

Above—WHERE THE COLORADO SPREADS OVER THE DELTA BELOW THE PESCADERO CUT

Below—IN THE PESCADERO CUT, BY WHICH THE COLORADO WAS DIVERTED FROM VOLCANO LAKE

Above—SHARP'S HEADING, WHERE I PORTAGED FROM THE IMPERIAL CANAL TO THE ALAMO

Below—WHERE THE COLORADO NEARS THE GULF OF CALIFORNIA

pared to enjoy my ride down the ancient channel of the Colorado.

At the end of a few hundred yards I drifted by the ends of the wire fence that marked the International Boundary Line, passing into Mexico without formality of Customs. Plainly the canal was not a highway of commerce. A little farther, and the tops of the golden willows had hidden the gates of the heading, and for all that met my eyes for a while I might have been gliding down just such a stretch of jungle river as we had navigated a fortnight previously in the heart of the delta. The general course of the old Alamo had approximated very closely that of the straightest line to the head of Imperial Valley. In the opening of the canal, therefore, new cutting had been resorted to only in straightening out the bends. The banks of these short-cuts were so grown up with trees, and had taken on so many characteristics of the river course, that one had to look twice to be sure where they began and ended.

An unexpectedly good current of four or five miles an hour carried me on apace. As I ran down toward the first bridge, the driver of a powerfully-engined truck that was crossing pulled up to watch me shoot through. As most of the flow of the canal concentrated upon the one narrow opening unblocked by driftwood, the navigation of the next ten seconds was a thing calling for undivided attention. And that was just what I was giving it—up to the instant an unmistakably Southern voice from the summit of the mountain of casks and cases piled upon the

truck hailed me with a genial: "Buddy, won't you climb out an' wet youah whistl'?" By the way that the current of the narrowed channel was swirling and eddying on both sides, I knew that any attempt to land against either the overhanging trees or the bridge would inevitably result in the wetting of a good deal more than my whistle. But while I had not the least intention of attempting to gain a position from which I could accept the well-meant invitation, I did not care to lay myself open to the apparent churlishness of failing to acknowledge it. Hence a momentarily dropped oar and a gracefully gracious wave of thanks—and regret. Hence, also, the solid jolt of my starboard bow against the pile on the right; and then the sounding thwack of the port beam against the piling on the left; and then an unclassified series of bumps down the tail of drift-wood below the bridge. I had had no idea that my sodden craft could take such blows without dissolving. The inertia of my monolithic bottom had driven it ahead in an independent jump of its own at every bump; yet, miraculously, there had been enough strength in the soggy sides to keep it from shearing its way out. With mounting confidence in the unexpected capacity of my shallop to take punishment, I settled back again to the oars.

With a honk and a parting cheer from its crew, the big truck headed northward toward the nearest gap in the Eighteenth Amendment. A green bottle, waved aloft in the hand of a bared forearm, flashed through a wedge of sunlight and threw a spatter of emerald gleams on the golden wall of the

engulfing willows. What a gay, kindly, care-free wight the bootlegger is, I reflected, and fell to wondering by what sort of official legerdemain those hulking casks and cases were to be passed through the fine diamond wire mesh of the International Boundary fence. And so on down the Grand Canal, with its bright walls of autumn-tinted leaves, to a second bridge, temporarily occupied by Colour—and Romance.

It was Colour that was first in evidence; Romance developed later. Swinging smartly round a bend, I discovered the whole far end of the vista closed with a barbaric rainbow of purple, magenta, cobalt and flaming scarlet—all the colour splashes of a tropical sunset. On nearer view the tinted arch revealed itself as a row of gaily dressed humans draped along the rail of a humpbacked bridge. A coronal knot of colour was clustered around what appeared to be a stalled motor-bus. The water was quiet and I landed—landed to the tinkle of guitars, the twang of banjos and the rattle of castanets, to find a light-footed señorita and a jaunty caballero pirouetting in the climacteric movements of a *jota*. North of the boundary I would have guessed movies, but here it was plainly something a bit nearer real life. The phenomenon was somewhat hard accounting for at first, principally because the whole dozen of them launched into the story in voluble, gesticulative Spanish all at once. But presently I had the gist of it. Musicians, singers and dancers from Mexicali on the way to a wedding fiesta somewhere near a canal. Road lost, gasoline exhausted, *tequila* almost

gone. "*Que lastima,* Señor!" "*Que lastima, amigos,*" I echoed, and begged to know what I could do for them.

I did not have any spare *gasolina* by any chance? No. *Que lastima,* again. To my inspired suggestion that they pool their stocks of *mescal* and *tequila* for motor fuel they returned a garrulous negative. *Tequila* was much too precious for so base a use. As for *mescal,* the driver feared that anything so highly *caliente* might burn out the cylinders. Besides, what was the hurry anyhow. The wedding *fiesta* would last for three or four days, and if they didn't arrive to-day, surely they would do so *mañana. Quien sabé* but a car with oceans of spare *gasolina* was chugging toward them at that very moment.

Then a dancer wearing the cocked hat and spangled jacket of a toreador was swept with a brain-wave. Since it was known that the *nupcial* was to be celebrated at a rancho situated upon a canal, surely the *barca* of the caballero must be passing right by it. And since the bark of the gentleman was longer than their omnibus, *quien sabe* but it would carry an equal load. Under the circumstances, of course, there was nothing for the gentleman to do but bow low and assure them with Old World courtesy that the bark was at their disposition. And not until a sudden scurry of colour and a chorus of squeals told me that I had been taken at my word did I realize that the suggestion was not advanced as a pleasantry.

There was a dash of poetic justice in the immediate sequel. Two of the girls—one with a guitar, the

other with a mandolin—managed to jump aboard and scramble to a precarious perch without upsetting either themselves or the boat. The little craft was far down by the stern, however, with a heavy list to port, the side toward the bank. Naturally, therefore, when the impetuous toreador jumped with both feet on the landward rail there was a considerable disturbance of equilibrium. The boat dipped water over the port quarter but the increased stability given it by its concrete bottom prevented a capsize. Not being similarly ballasted, the bull-fighter was thrown on his beam's end and planted deep into water and soft mud. While his companions fished him forth, I made the necessity of salvaging his floating cocked hat an excuse for pushing off without waiting for any further augmentation of my passenger list.

Paddling from the bow, I contrived to keep the boat on a sufficiently even trim to allow me to reach the fugitive sombrero. But when I suggested to the giggling pair in the stern that doubtless they had experienced enough of the perils of water transportation to last them for a while, tossed locks and a tinkled mandolin told me plainer than words that my stowaways were not going to be so easy to disembark. And when one of them assured me with a contemptuous snap of her fingers that a *chiquito zanza* like that upon which they were now afloat held no terrors for girls who had braved the wrath of the great tidal *burro* in the Guaymas steamers, I gave up and bowed to the inevitable. Passing forward the lighter of the minxes with anxious care, I dropped her upon my bed-roll and commanded her to sit per-

fectly quiet, like the mouse. Resuming my oars, I found that the boat, though very low in the water, still had a serviceable trim. Only the unforeseen would peril us, I told myself confidently.

Discipline was perfect to begin with. Duly impressed by my designedly stressed precautionary injunctions, both passengers sat stiff as ramrods, even asking my permission before waving adieu to their friends on the bridge. Everyone seemed to assume that the rendezvous was just around the next bend—that our arrival would be but the matter of a few minutes. The freshly opened vista revealed no signs of a festal rancho, but smooth, quiet-flowing waters did induce a relaxation of discipline. Lounging at ease, now one girl and now the other told colourful bits of her life in the dance halls of Guaymas, Mazatlan, Guadalajara and Ciudad Mexico, always to the strummed or tinkled obbligato of the instrument on her knee. Maria was a singer and Carmencita both a singer and a dancer. They had shared the usual ups and downs. There had been some months of hectic prosperity in Mexicali and then—pouf!—all the dance halls burn up and they are down on the rocks again. *Que lastima, Don Luis!* So soon were we calling each other by our first names.

I descanted more on my future than upon my past, and in particular that part of my future which had to do with shipping a crew for the run down the brush and barged-wire-choked gorge of the lower Alamo. I should have known better. Both stowaways promptly declared they were *marineros,* true and tried, and volunteered *en masse.* That worried

me a bit. I could have wished that they would take their *fiesta* engagement more seriously.

Carmencita's music was mostly in her toes. Her song had too much metal (mostly of the baser sorts) in it for melody. But Maria had a real voice; that was evident even from her hummings to her strummings. I asked her for *La Golondrina,* and she sang the song of the homing swallow with a lilt to raise a lump in the throat. The fiery *La Paloma,* with great reluctance, I had to quench. Carmencita could not make her feet behave at the challenge of the blood-stirring air, and even the swaying of Maria's lithe body to the accompaniment of snapped-finger castanets was more than was good for a boat with a scant two inches of freeboard.

Carmencita reined in her runaway feet with an effort, but begged so winsomely to be allowed to show me—just in no more than a teeny-weeny pit-a-pat pantomime—some new steps she had improvised to the Paloma air that I relented and gave consent. Darn it! I should have known enough to confine her to a description in words. The minx was as good as her promise to do nothing to rock the boat; but with eyes and toes a-twinkle, and mandolin a-tinkle, she did make it hard for the skipper to keep both eyes on the course ahead. And that was how I failed to note the set of the quickening current and allowed it to carry the boat under an overhanging willow.

In the rivers of the northwest they give the name of "sweeper" to the low-lying tree that lurks to ambush the unwary boatman or raftman. This southern prototype lived up to the name by sweeping Maria

off her perch in the bow and jack-knifing her over the side of the heeling boat. She kept from being swept overboard by grabbing the gunwale with both hands, but in so doing abandoned to the flood her precious guitar. Floating buoyantly, the gaily beribboned instrument lodged solidly against branches which the heavier boat brushed aside or swung round. It was a hard pull against the current, but Maria's agonized eyes and a guilty conscience were effective spurs and I finally nosed back within grabbing distance of the now half-filled guitar.

After giving her pet first-aid treatment by upending and draining it over my grub-box, Maria trundled it across her skinned knees (rasped on the concrete bottom) and tried to wind in the slack of the soaked and sagging strings. In a feeble but well-meant effort to cheer up the poor girl, I perpetrated a sad sort of a joke to the effect that the guitar's wetting ought to have the effect of improving its liquid notes. Then I tried to explain in Spanish why people of easily tickled risibilities might consider this a witticism under favourable circumstances. My meticulously charted elucidation was a mile long (measured by the canal), and then it was Carmencita rather than Maria who thought she saw the point. "*Si, Senor,*" chirruped she of the twinkling toes clapping her hands in ecstatic appreciation; "*Yo mi gusta tequila tambien.*" She also liked *tequila!* Well, at any rate the shrewd wench sensed I was trying to say something about a liquid.

Both Maria and Carmencita were very handsome about the accident—handsome so far as I was con-

cerned, that is. Carmencita charged that it was Maria's fault for not keeping a better lookout; Maria maintained that Carmencita was responsible for diverting my attention with her shadow dancing. There was enough difference of opinion here for an argument, and a hot exchange was forthwith precipitated over and round about my bobbing head. As the passive object between the upper and nether millstones I was becoming decidedly nervous, especially when I thought I detected Maria's twitching fingers fumbling in the grub box for solid shot with which to follow up her verbal barrage. Fortunately timely intervention in the form of a group of low thatched structures opening up ahead prevented the outbreak of active hostilities.

There were no signs of a fiesta visible as we landed at the squalid *rancheria,* nor did any of the colony of Cocopah Indians to whom it belonged know anything of such a function being in progress anywhere in their vicinity. Two other brushy little settlements were equally barren of constructive news. Toward the end of the afternoon a chill desert wind came up, blowing from directly ahead and materially slowing down progress. Maria and Carmencita complained of cold and demanded a joint shift at the oars as a warmer-up. I compromised by distributing my inflatable mattress and life-jacket to them for covering. Blowing up the funny contrivances occupied them, mentally and physically, until after sunset; and in the deepening shadows of the purple twilight we came to a large, prosperous-looking rancho, the *patrone* of which knew all about a grand wedding fiesta on a

hacienda by a canal. There had been talk of it in Mexicali the previous Sunday. It was on the Sulfatero Canal, over toward Volcano Lake, and perhaps forty *kilometros* distant by road. The heading of the Sulfatero was at Cudahy Check, twenty *kilometros* farther down the Alamo, but he doubted if a boat could get through the branch canal on account of the bridges. It would be best to go by road direct, and if we would consent to be his guests for the night, he would esteem it an honour to take us there in his car in the morning.

Maria and Carmencita yelped their delight. Though less vocal in expression, I was not a little relieved myself. Sindbad the Sailor's Old Man of the Sea would have been nothing to the volunteer crew I had begun to fear was going to follow me into the gorge of the lower Alamo. Wolfing a hasty bowl of *chile con carne* with the genial rancher by way of stirrup-cup, I bade an affectionate *adois* to Carmencita and Maria and pushed off in the gathering dusk. What became of the engaging pair I never learned, but I am moved to speculation every time I hear of a wedding to be celebrated with pomp and splendour.

The superintendent at Cudahy Check had been advised from headquarters to expect my arrival by sunset. Now, at nightfall, there were still nearly fifteen miles to go. There was no moon, but the channel was open and it was not hard to find the middle of it by the reflections of the stars. Pulling steadily in a rapid current hours and miles slipped swiftly by. A little before nine the low rumble of

falling water was borne on the breeze from the darkness ahead, and ten minutes later I landed on a soft bank of Bermuda grass to which I had been guided by a Mexican on watch with a lantern. Crossing to the north side of the canal on the gates, I climbed up to Superintendent Lydy's pile-built bungalow to supper and a welcome bed.

The next morning my host, who was a real bibliophile, showed me his wonderfully choice little library, and we talked books for an hour before motoring over to the Cudahy Ranch for lunch with the hospitable manager. Returning early in the afternoon, we portaged the boat round the gates by dragging it over the soft grass carpet with Mr. Lydy's Ford. There was a heavy backsetting current drawing toward the falls over the dam from the eddy where we relaunched the boat, but with plenty of oar-room it was not hard to pull out of it. The canal now ran mostly in an artificial cut, with high banks that were occasionally used for roads or foot-paths. Warned by my experience of the previous day that "he travels the fastest who travels alone," I declined with thanks a number of gracious invitations to pull in and embark trudging would-be passengers. Making good time in spite of a heavy head-wind, I tied up above the gates at East Side Heading an hour before dark. Superintendent Elliot regaled me with an astonishingly appetizing Mexican dinner, cooked by himself, and put me up for the night in a vine-covered *casita* below the dam. Effecting another Ford-drawn portage in the morning, I pulled on to Sharp's Heading, the end of the main canal and the begin-

ning of the Alamo Waste. The active part of my voyage was to begin at this point.

It was in the deep, narrow, brush-choked gorge opening up below that my better senses had warned that an extra man or two would be needed to keep out of trouble. When I left for Andrade, District headquarters in Calexico had promised to make every effort to recruit at least one volunteer and have him waiting for me at Sharp's Heading. None had come forward, it appeared, but Superintendent White had been instructed to give me every assistance in case I still cared to proceed. After vainly trying to persuade Mr. White to interpret this as official sanction to take the Sunday afternoon off and sign on with me for at least the run to Holtville, I yielded to the insidious fascination of that black gash in the alkali plain leading north to the International Boundary and decided to chance it alone.

White and a couple of his Mexican hands helped me with the long portage. The level of the Alamo channel was twenty-five or thirty feet lower than that of the main canal. The surplus water from the latter was released through gates to tumble down a concrete chute to a broad, shallow pool which drained to the gorge from its farther side. The boat, with its concrete-slab bottom, was heavy out of all proportion to its size, so that the portage, mostly through brush and trees, was downright hard work. Stripping off my shirt for freer action, I neglected to replace it after launching the boat and pulling out into the churning pool. That was how I qualified for in-

itiation into the way of the thorn of the mesquite with the human epidermis.

My first surprise had to do with the very considerable volume of water that was tumbling over the concrete falls and swirling about the pool below; my second was anent the force of the draw toward the opening of the gorge beyond; my third was confused, but seemed based on the fact that I was clinging to an all but heeled over boat and being flayed alive with whips of hot fish-hooks. I had noted that the opening to the gorge was more than half closed by an undermined and fallen mesquite of great size; also that there appeared to be room to avoid the obstruction by passing on the right. What I failed to observe—until too late, that is—was the fact that the main current set directly through what had been the topmost branches of the tree, and that the open passage was only reachable by working cautiously down the side of the pool. When I realized that there was not room to pull clear, I probably did the next best thing in laying hard on to my oars and barging into the barrier like a bull at a gate.

As long as the boat kept breaking through the crackling brush head-on it continued upon a fairly even keel. Once it swung athwart the current, however, its upstream rail was hove under and I only prevented an upset by dropping the oars and clinging to the brittle, spine-armoured branches. Under the circumstances, I was doubtless fortunate in losing no more than an oar and a few square inches of hide. With no oar in reserve, the pursuit of the castaway

blade resolved itself into a rough-and-tumble stern-chase. Twice the runaway hung up in its flight, but each time it was dislodged and sent on when the boat bumped into the brush which had stopped it. When I was finally carried past it on the opposite side of the stream I gave it up for lost, for there was no possible chance of either paddling or poling back against the swift current. Luckily a narrow bar appeared on the inside of a band a hundred yards below, and landing on this I managed to climb out and pick my painful way back along the bank to where the fugitive oar was teetering across the end of a bobbing snag. Of course that temperamental strip of ash had to swing free again just as my reaching fingers were about to close upon its shoreward end, leaving nothing else to do but jump in and swim down to the boat with it. I needed the bath anyway, and the warm, silty water took some of the smart out of the cross-hatching of scratches on my neck and back.

Buckling on a life preserver over a canvas coat, I pushed off again into that curling, coiling chute of hard-running water. Higher and steeper sides provided less favourable footholds for trees for the next mile or two and navigation was slightly less hectic. Most of the obstructions were of prostrate willows, and all but the densest of these it was possible to shoot right through without much risk. Two or three of the heaviest I had to ease down into and cut away the trunks. This had to be done with no end of care to keep a rail from being carried under as the current jammed the boat side-on into the barrier. Just as I had anticipated, clearing a channel and making a

forced landing were the operations in which extra hands were vitally necessary. Realizing that sooner or later disaster would be the inevitable consequence of continuing solo, I resolved to miss no chance to pick up a crew even if it had to be "shanghaied." Even an Indian or a Mexican peon with sense enough to fend off or hang on, as the occasion demanded, would be better than no one.

My initial attempt at recruiting was not encouraging. Coming suddenly upon what appeared to be a hidden camp in a cave dug out of the left-hand wall of clay, I hailed the greasy knot around the cooking-fire and pulled in hard to attempt landing. The startled ruffians leapt to their feet, but far from trying to catch my flung painter began edging back toward a path up the bluff as though undecided whether to fight or fly. They swarmed down to the water with a sort of swaggering bravado as the boat was carried by, and when the trailing painter caught on a snag so that I was keeled over backward from the jolt, they broke into a chorus of noisy but not especially hostile guffaws. Probably the picturesque camp, well concealed from above, was a sort of hiding-out place for some of the scum of Mexicali. Possibly it was the outpost of a Chinese smuggling gang or a bootlegging outfit. In any event, the hirsute renegades did not impress me as being sufficiently favourable small-boat sailoring material to justify persisting in my "shanghai-ing" plan.

At just what point I crossed back into the United States I was not quite sure. The boundary fence is not visible from the bottom of the Alamo gorge; or

if it is, I did not see it. The first evidence I had of being on the American side was a bridge—a crude frame of planks and timbers filling the whole notch of the cut from water to rim. I had visited that particular ramshackle structure on my preliminary trip of inspection, and had made written note of it as a potential source of grief. My notation read: "Swift current; narrow channel; abrupt banks; scant clearance in middle. Try to look over before running. Shack below in trees on left."

The impression on my mind from looking down to the water from the rail was that, at worst, I might have to stop rowing and duck my head in passing under this bridge. Now, driving down upon it between banks that offered no possible chance of landing, I saw that I had either been much too optimistic or that there had been a considerable rise in the stream. Put in just right, there appeared a chance that my boat would clear the lowest girders, but with no more than two or three inches to spare. Anything sticking up higher than that was going to bump.

There was no time to trim the somewhat loosely piled bags in the bow; trimming my own gangling bulk was quite enough problem in itself. Probably I managed it in about the only way possible. Pulling hard for the opening, I drew in my oars after a final vigorous stroke and, just as the nose of the boat shot under the lowest stringer, flopped down flat on the concrete bottom. That was just about my only really finessed operation of the day. Out we came below without a bump, if that of my head and knees on the concrete were not counted, I mean. Nothing

was knocked off but my bed-roll, and this bobbed buoyantly on in our wake and was easily recovered.

Elated by my success, I was emboldened to attempt forthwith a feat which, offhand, seemed not nearly so difficult as that of shooting through the restricted space under the bridge. This was to make a quick landing on a narrow notch of terrace which it appeared someone living above had cut to dip water from. With the swift current undercutting the bank, it would have required nice work, on the part of two men, to bring a boat in here properly; for one it proved a bit too much. I brought the bow into the bank at the right place, and I dropped my oars and jumped for the terrace in time to secure a momentary footing. But before I could recover my balance and brace against the pull, the boat had raced to the end of its painter and over I keeled into the water. Deep as I went, my feet struck nothing that felt like bottom; indeed, the first solid thing with which I came in contact was the boat, into the stern of which my shoulder bumped as I came up alongside where it was lodged against the overhanging willows, fifty feet below. Here the noise I made breaking dead branches in an effort to carry the painter ashore attracted the attention of a grizzled old codger in the shack above, and he came limping down to give me a hand. Making a hurried shift into dry togs, I climbed out and accepted an invitation to join him at his late Sunday dinner—baked beans spread with wild comb honey!

The old fellow, who was "squatting" in his present home with a few bees and chickens, said that he had

once been the owner of a half section a few miles below Holtville. The best of this had been taken by the river when the Colorado ran to Salton Sea during the overflows of 1905 and 1906. If I had chanced along at that time, he asserted, I might have had a real kick out of running the Alamo; it was a continuous succession of receding waterfalls from end to end. As an example of the remarkable "cutting-back" action of the Colorado, he told of going to bed one night with the river flowing across his ranch in a comparatively broad, shallow channel, to drop over a sheer twenty-foot fall into a deep, narrow gorge a quarter of a mile below. In the darkness there came a great roaring, like the noise of an approaching and receding train, only much slower in movement. The next morning he went out to find his house perched on the brink of a thirty-feet-deep cutting, with the waterfall crabbing back deeply into the next ranch above. It had burrowed nearly half a mile during the night, he said, and that was the way the present gorge of the Alamo came to be formed.

The yarn sounded a bit wild at the moment, but subsequent inquiries of engineers who were in the Valley at the time of the two great overflows proved that the only exaggeration was in respect to the waterfall's rate of progress. Half a mile a night was rather exceeding the speed-limit; yet C. N. Perry, Chief Engineer of the original California Development Company, assured me that he had known a cataract to cut back over a hundred yards between dark and daylight. It is this cutting action which,

if ever carried back to the main channel of the Colorado, would undoubtedly make it impossible to turn that outlaw stream again to the Gulf of California until the whole below-sea-level depression of the Imperial Valley were completely submerged.

The old squatter's parting injunction was to look out for chicken-coops below. I replied that, unless my youthful technique had suffered serious deterioration with the years, chicken-coops would have more reason to look out for me than I for them. Then it came to me that he was referring to the box-like frames, covered with galvanized wire, that were employed here and there to prevent cutting of the banks, and I promptly apologized for my frivolity. I did run into several nests of the queer contrivances, all of them considerably messed up as a consequence of undercuttings and broken moorings. Fortunately none of them was squarely across the main channel. Attempting to run a "chicken-coop"-blocked rapid would have been to invite almost certain disaster, while portaging would have been scarcely less risky.

One of the strangest sections I passed was that where the Alamo cut through a three- or four-miles-wide desert of blow-sand. The gorge was fifty feet deep in places here with its walls (capped with the half-domes of dunes) ready to cave at a touch. Running through, with the swift current swinging from bank to bank, had all the tenseness of threading an Alpine pass on a day when the June sun is setting the hair-poised avalanches a-quiver on the heights above. Low sand bars and eddies on the insides of the bends gave good opportunity to keep from bump-

ing the worst of the hanging walls. I started a slide the only time I hit solidly, but managed to pull away without shipping more than three or four buckets of sand. Before I was out of sight an adjoining section of bank broke loose, putting down a slide big enough to have swamped a barge.

So far barbed-wire had proved less of a menace than I had anticipated. At several points the undermined fences of abandoned fields were draped over the cliffs, but the loose ends dangling in the water showed no disposition to dispute my passage. Then suddenly, in a narrower, swifter stretch of water than any yet encountered, a thin streak of white foam, spanning the stream from side to side, caught the tail of my forward-scouting eye. The ends of a single strand of wire showed near the bank on either side, and the streak of foam was evidently kicked up by the connecting bight just below the surface of the water.

The temptation was strong to lay on to my oars, get under all the way possible and try to run over or break through the obstructing strand. Discretion supervened just in time to let me swing the boat and begin to breast the stream with the stern not over three or four feet from the kicking wire. Pulling my hardest, I was still not quite able to hold my own against the full midstream strength of the current. All but winded at the end of five minutes, and with a net loss of a couple of feet to show for my exertions, there was nothing left to do but turn quartering and try to shoot over to the slower current against the bank before the boat fouled the wire. Striking the

latter beam-on meant a certain upset, but the chance had to be taken for the lack of any alternative.

It was a near squeeze, with the jiggering barbs rasping up and down the starboard quarter several times before I nosed into water against which I could make appreciable headway. Then the fringing willows began to impede rowing, so that I finally was forced to drop the oars and trust to pulling the boat upstream by the branches. A good deal of water was slopped over in the course of a very awkward and messy landing, but it was better than being carried down to an involuntary slack-wire performance in midstream. The bank proved to be no more than an unstable platform of intertwined willow-roots, deeply undercut by the current. An oar was not long enough to reach bottom from the stern of the boat.

Although the wire did not appear to be the extension of a fence, the end of it was so deeply buried in the ground that I had to cut it before casting it loose. Once I found a chopping-block, this was readily effected with an ax. A policeman in El Centro subsequently told me that he had seen the obstructing strand in the course of a raid upon a camp of Mexican bandits in the Alamo bottoms a few weeks previously. The gang had caches on both sides of the river, and he thought that the wire might have been used as a sort of emergency ferry. Not anticipating that the Alamo would be used for boating, they had not removed what he quite agreed with me in considering a distinct menace to navigation.

On reëmbarking I noticed for the first time a

strange and altogether unaccountable restlessness in the current of the hard-running stream. It was not only flowing much more swiftly, but there was also a tendency for the water to break into foaming waves, like lines of spent breakers, that rolled upon the banks and threw spray well above the previous high-water mark. With no time to study the queer phenomenon, I attributed it in an offhand sort of way to the fact that the descent of the river was increasing and let it go at that. It was not until the next day that I learned that a sudden rise in the Colorado, all of which at the time was being diverted into the main Imperial Valley Canal, had overtaxed the capacity of the latter and forced the discharge of the surplus into the Alamo Waste at Sharp's Heading. The flow of the Alamo had been more than doubled in a few minutes, and it was the crest of this rise that I unwittingly found myself riding on pushing off below the bandits' wire-factory.

I was too busy for the next mile keeping the boat from banging the cliffs to have much time to notice physical features. The walls, if anything, were higher than anywhere above, and most of the talus had been scoured away by the fierce current. Fringing brush and trees, for lack of a foothold, were scanty. The down-running waves increased rapidly in violence, and it was this which appeared to be responsible for an acceleration of the slidings and cavings from the undermined walls. The water was thick with mud and covered with gobs of yellow foam. The heaviness of the medium in which it now wallowed made the

boat crankier in every way—much harder to control with the oars.

I was just trying to identify a cascade of clear water tumbling down a deep artificial cut on the right as the mouth of the one of the new drainage ditches, when a deep roar and a falling away of the surface ahead seemed to herald the approach to a real rapid—something I had never dreamed was to be encountered in the rockless Alamo. Swinging the bow upstream, I began to pull against the current and look for a landing. But the walls, although the interval between them had increased somewhat, were sheer to the water's edge. Whatever the nature of the stretch immediately ahead, there was nothing to do but try to run it. Congratulating myself on at least having had the foresight to lash in most of my loose bags before pushing off at the wire, I pulled into the middle of the stream and let the boat drift down stern-first toward the big noise.

The sight opening up as I was whirled over the brink of a long, broken descent was a truly remarkable one. Greatly broadened and shallowed, the augmented stream tumbled down over a riffle of hard clay in a foaming yellow torrent. Rounded knobs of bed-clay, cropping up at frequent intervals, threw off back-combing waves like the rollers of a veritable boulder rapid. Sharp points of cliff, like the saw-teeth in the jaws of an almost closed wolf-trap, hurled the current back from one side to the other as far as the eye could reach. The bends were abrupt and jagged like those of a letter Z rather than the rounded

curves of an S. With the boat under complete and continuous control there was a fighting chance of keeping in midstream all the way through; otherwise there was going to be just one bump after another. Never have I headed into rough water with less of an idea what the outcome was going to be.

Before I was at the foot of the first plunge the oars began to strike solid bottom. Then the boat itself touched—lightly the first time, but with heavier impact as the descent increased and the water shallowed. When the stern failed to slide over a barely submerged knob of clay which I had been unable to avoid, the bow started swinging downstream. From that moment on I lost control of it completely. Now the bow was upstream, now the stern; and every time one of the heeling sides was presented to the current a solid wave of water came over. Once, when the bow shot up on a rounded hummock and hung for an instant, a yellow-brown comber rolled right in over the lowered stern. Harder than ever to handle with this shifting load of water, my flailing oars were quite unable to keep the wallowing little tub longer in midstream. Reeling drunkenly to the side after grounding on a dividing shoal, it was carried away almost at right angles and driven down a narrow, steep side channel squarely against a jutting point of cliff which I had been trying to manœuvre to avoid.

The back-curling wave from the overhanging wall of indurated clay must have softened the jar of impact considerably; even so it was crushingly solid. The colliding bow crumpled and opened up, spreading like a fan. Most of the damage was wrought by

the cliff trying to get inside the boat; the rest by the monolithic bottom trying to get outside. Neither quite succeeded, for the moment.

Disappointed in its attempt to effect complete disintegration of the boat by ramming it against the cliff, the resourceful torrent now modified its plan of attack. The flood hurled off from the side-wall found its way back to the main stream through a sharply descending chute, formed by the head of a narrow talus beneath the cliff and a sheer-walled little island of bed-clay. Headed down carefully bow- or stern-first, the boat would probably have run the tumbling cascade and come out right-side-up below. Slammed beam-on across the head of the eight-feet-wide opening it only clapped on to the wet clay like a limpet and cut off half the flow of the flood behind it. In an instant the mounting waters poured over the upstream rail, heaving it down until the full force of the current was exerted against the shattered bottom. Scrambling to my feet at the sound of an ominous cracking, I grabbed the painter with the intention of jumping out on the talus. The concentration of my weight at one point amidships had the effect of springing the dead-fall the river had set. As though in emulation of the lily in the song which folded all its sweetness up and slipped in to the bosom of the lake, my poor little argosy clapped its bow and stern together and went banging down the muddy cascade with a broken back.

I, of course, was swept along with the procession, which also included a varied assortment of dangling bags, boxes and cooking utensils, with a rag-tag tail

of unsecured floatables. Fumbling for a plank or other piece of the wreck upon which to ride the flood, I was presently clutching to my bosom a tombstone-sized fragment of concrete, the salient physical property of which was negative buoyancy. I released the slab the instant its true character came home to me. Unfortunately, this was at the moment my own abused anatomy was on the under side of a roll, so that a rasp-edged fracture had a good chance to sideswipe my face as the best of my highly vaunted concrete bottom sought its lowest level.

Bumping down along the bottom was rather less punishing than one would have expected. This was doubtless due to the absence of the boulders which constitute the teeth of most rapids. This one, notwithstanding the way it had chewed up my boat, growled harder than it bit. Instead of carrying the wreckage out into midstream and bearing it along to where it could be masticated at leisure as a really vicious rapid would have done, the whole mess, including myself, was allowed to drift in against the talus on the right. Held together by copper patches, the forward and after sections of the boat could still be manœuvred as a single unit. Working them along to a convenient eddy by a line attached to the broken stern, I proceeded with salvage work at my leisure.

Everything unsecured was gone. This included most of the provisions and my tripod. A leather case, with its carrying strap looped around a strip inside the gunwale, still held a soaked but otherwise not greatly damaged camera. Even the film was not

quite a total loss, as I found when it was developed a fortnight later.

After cracking out and throwing overboard the residue of the concrete bottom the lightened wreck was comparatively easy to handle. The tenacious copper patches still refused to tear away, but they were loose enough to allow either section to be dragged along a foot or two without being hampered by the weight of the other. In this way I worked them up the sharply sloping talus against the foot of the cliff wall, where they were safe against anything less than a ten-foot rise. Stacking my salvaged outfit against the wreckage to drain, I began casting about for a way to climb out. I knew Holtville could not be many miles distant, with ranches at frequent intervals between. It was evident that men and ropes would be needed to remove any of the outfit. Indeed, it looked just a bit doubtful as to whether I could remove even myself without some such aid.

With the river surging against the cliffs both above and below the short length of talus on which I was marooned, possible avenues of escape were considerably restricted. The only place I could reach where the wall was not either sheer or overhanging proved to be almost immediately behind the point to which I had dragged the wreck of the boat. Here an incipient crack in the slightly receding face appeared to offer at least a starting place.

With neither head nor foot especially adapted to steeple-jack work of this sort, I began the climb for the very good reason that the only other alternative to it was the extremely dubious one of calling for

help. There seemed a better chance of making my legs carry forty feet than to make my voice carry a mile. Climbing with hand and foot, I made the first twenty feet without much trouble. Then, hanging like a fly half way to the top, I discovered that the upper stratum of the cliff was too hard and too smooth to offer practicable handholds and footholds. About the same moment it came home to me that steps would have to be cut the rest of the way I recalled that no ax had been included among the articles salvaged.

A search among the dripping bags revealed a large butcher-knife as the most formidable cutting tool remaining. With the indurated clay of the upper cliff proving of an almost stony hardness, the notching of even the shallowest of steps was a slow and laborious undertaking. Also, with most of the chipped fragments going down the neck of my wet shirt, it was a very dirty and unpleasant one. The last twenty feet took me an hour to scale, and when I finally dragged myself over the rim the sun was just dipping behind the dunes beyond the opposite cliff and the chill of the early autumn twilight was imparting a nip to the clear desert air.

No housetops met my eye in any direction, but not far beyond the edge of the zone of sand and sage brush the green of tall trees and the dome of a haystack seemed to locate a ranch at no great distance. A quarter of a mile in soft sand took me to the corner of a field of starved alfalfa, at the far side of which appeared the ramshackle outbuildings of a dairy farm. The low boxlike house of weatherbeaten clap-

boards did not have an inviting appearance, even to a refugee from the depths of the Alamo Gorge; nor did it belie its looks. A rangy brindle mongrel, evidently encouraged from within, bounded out of the open door and, bristling and snarling, charged down upon me full tilt. It came to a sliding stop at the flash of my brandished butcher-knife, gave one wild-eyed glance of appraisal, and then, tail between legs and whimpering, bolted back to cover. A closing door just missed the rear of the fugitive's fear-arched spine. Followed immediately the bang of another door or two; then, hard upon staccato orders, the jar of slammed windows. Almost did I cock an ear for the familiar cry of "Camera!" so much was that frenzied barricading like a scene from a Wild West movie thriller.

I should have been warned by the terror of the dog that there was something in my appearance not entirely calculated to inspire confidence in what was plainly an hysterical farm-wife left alone and unprotected with her young. Absorbed in my own troubles, however, I missed the point, and so shambled right on up to the front of the house and started blurting out my story to a pair of fear-stricken eyes—twin pools of horror—that stared out at me through the grimy pane of a closed window. The reply was a wail of anguish—echoed in several octaves of childish trebles—and a snapped-down shade. The backing of opaque green curtain instantly converted the pane into a very fair sort of mirror, and for the first time I stood eye to eye with the Thing of

Terror that had turned to water the heart of the savage watch-dog and driven the buxom farm-wife to the verge of hysteria.

I did not need a looking-glass to tell me that a shoe and most of one leg of my trousers were missing; also much of a shirt and a good deal of cuticle from unprotected sections of hide. I should have known without a mirror that I was not dressed for a Sunday afternoon call. And I did know in a general sort of way that the section of my phiz sideswiped by the slab of concrete was decorated with a multi-coloured bas-relief of clay and clotted blood; likewise that my tousled locks were matted hard as the hair of a statue. And I might have known that a hacked-bladed butcher-knife did not lend what the most liberal interpretation might class as a reassuring effect. Vaguely conscious of all of these things, it took the grinning apparition in the window-pane to focus their import in my mind. Then, of course, my common sense told me that further protestations were vain; that the one thing to do was to fade away into the gathering darkness before the terrified woman inside recovered sufficiently to phone to Holtville for the officers and start a hue and cry.

Sluicing off as much dirt as possible in the first irrigating ditch, I threw the butcher-knife under a bridge and pressed on to the next ranch. Here a lanky drawling-voiced Texan finishing a belated milking cast an appraising eye over my lantern-lighted form and evidently classified me as "migratory farm labour." Saying that he would give me supper and a bed if I would turn the cream separator, he

added that he reckoned he could find a job for me in the morning if I "keered to stick round a spell." Assuming that my battered anatomy was the by-product of a Saturday night spree in Mexicali, he said he "kalkerlated thet dern red-eyed rescal 'ud make a haun' dawg ready to fit a elefant." He hoped I had gouged up the greasers as much as they'd gouged up me, and expressed some surprise that they hadn't used a knife on me. Some dirty scrapper, the cholo.

Grunting noncommittal assent, I bent to the crank of the shining separator as the boys and girls of the family trudged in from the cows with the warm, fragrant milk, and refrained from enlarging upon my own troubles until after supper. Although my assertion that there was rough water in a near-by stretch of the Alamo gorge was news to all but one of the younger boys, my yarn found ready credence. The rancher, Covey by name, expressed himself as quite ready to go over and attempt salvage operations by moonlight, but I preferred to take the chance of losing my outfit by a continued rise to trying to crab back down the cliff in anything less than the light of day.

Most of the Texan's large and growing family joined the expedition in the morning. Hitching a team to a waggon as soon as five o'clock milking was over, we reached the brink by dawn. The water had risen several feet in the night but was now receding. The rapid was still very swift but by no means so broken as the evening before, doubtless due to the fact that the crest of the rise was long past. With

most of the knobs of clay well covered, running through with a boat appeared quite practicable. But not with the wreck of my boat of yesterday. That seemed finished beyond all hope of repair. The only reason I refrained from dismantling the remains was against the chance that I should not be able to secure a substitute in which to continue my voyage.

My sodden outfit was sent up piece by piece on the end of a rope and carried back to the ranch to unpack and dry out. Covey drove me in to Holtville, where an hour's inquiry failed to uncover either a boat or a carpenter capable of constructing anything more boatlike than a square-ended scow. This left no other alternative than that of trying to synthesize another craft out of the salvable fragments of the wreckage of my late argosy. Superintendent Sterling of Number Four Water Company very kindly put a truck and a dozen men at my disposal, and at the end of an afternoon of hard work we had all but the shattered concrete bottom hauled out on top of the cliff. An hour later, in Holtville, we began working on the puzzle of assembling the pieces. By dark of the following day the job was complete.

Rarely can there have been so fearful and wonderful a work of reconditioning in all the annals of shipbuilding. First the severed sections were worried together and reunited by a liberal reinforcing of planking. Then the crazy misshapen hull was smeared thick with tar and covered with canvas. Another layer of tar on the canvas made ready for a complete sheathing of light galvanized iron. The finished craft was really made up of three and a

Above—WHEELBARROW PORTAGE AT NO. 9 HEADING
Below—ARRIVAL AT THE END OF THE JETTY FROM MULLET ISLAND

WHERE THE CHANNEL OF THE ALAMO LEADS DOWN TO THE SALTON SEA

THE OUTERMOST POST IN SALTON SEA

half boats: one and a half of wood, one of canvas, and one of galvanized iron. Taking it out by truck to Rositas Heading, we launched it below the dam the next morning. Displacing more water than even the concrete-bottomed original, it still gave a grudging response to the oars and was almost proof against leakage. Its capacity to withstand punishment had yet to be proved.

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In spite of the fact that twice as much mileage lay ahead as behind me, and twice as great a descent, the worst of my navigational troubles were over at Rositas Heading. This was due partly to a more open river, but mostly to the tardy shipping of a sailing mate. Tempted by the shooting, and undeterred by the threat of another disaster, Superintendent Harry Fee, in charge of the works at the Heading, accepted with alacrity my invitation to take a leave of absence and join me for the final stage of the run to Salton Sea. Mrs. Fee, also quite game to sign on for the voyage but prevented by lack of room, promised to drive over and meet us at Mullet Island two days hence. We were only a few hours late for the rendezvous.

The first day the river meandered between low bluffs, and there was more trouble from shallows than from swift water. Ducks were constantly whirring along overhead, with plover and snipe wading at almost every bar. With these, and with cream, dates and honey in generous stock, living was high. At the little dam near Calipatria we ran the boat around on a wheelbarrow—still another variant on

the many methods of portage I had resorted to since leaving Yuma. From here on to Salton Sea the Alamo was narrow and swift and badly choked with trees, drift and wire at many points. Alone, the passage would have been scarcely less hectic than the wild Sunday afternoon's run down from Sharp's Heading to the wreck in the rapid above Holtville; with the quick-footed and quick-minded Fee fending off with a pole or helping to let down along the bank, nothing more serious happened than the occasional shipping of a half-boat-load of water.

Early on the morning of the third day an opening in the fringing willows revealed the towering wall of the San Jacintos, rose-pink in the first flush of the dawn, with the silver surface of Salton Sea sparkling between. A great flock of swimming pelican, magnified by the mirage until they had the seeming of a mile of drifting icebergs, all but blocked the broadening mouth of the river. The boat nearly bumped into the vanguard as it slipped noiselessly down across the bar. Then, with a thunderous roar of wings, countless thousands of the huge birds launched into the air as at a common signal, casting the shadows of twilight on the waters as they circled across the red disc of the rising sun.

Where the delta fan opened to its broadest the tips of my oars touched sand for a few strokes. A hundred yards more and the swirl of them brought up inky black mud. This thinned and faded to the tawny red of unmistakable Colorado River silt, and presently I was pulling in deep, clear green water. Taking a bearing on the grey loom of Mullet Island

far to the northeast, I settled back to my oars for a long, steady pull. We were still two miles from our goal when whorls of red began rising again at the end of each stroke. These thickened and darkened until the oar-blades began striking into sooty mud. So soft was this buttery medium that I only became aware that the bow was sliding through it by what was at first an almost imperceptible retardation of progress. This drag increased slowly but steadily until, with nothing remaining but the shallow sheet of water driven in before the rising westerly breeze, I was literally rowing in mud.

Captain Davis had been as good as his word in the matter of attempting to set a line of poles from the end of his causeway across the flats. This only extended out a couple of hundred yards, however, leaving an equal distance still to be traversed before reaching the first post. A pole disappeared its whole length in driving the boat forward six inches. Pulling it out drew the boat back a foot. There was nothing to do but row, and even in that a special mud technique had to be developed. A stroke deep enough to bury the oars sent the boat ahead several inches, but it backed it up practically the same distance in disengaging them. Experience proved that the proper thing was a light, skimming stroke, with the bottom of the blade no more than grooving the top of the mud. There was probably not more than half an inch to the stroke of drive in it, but what we gained we held.

That last two hundred yards took almost as long to cover as had the whole distance from the mouth

of the Alamo that was pulled in deep water. But I was finally rewarded by feeling the bow bump against the outermost of the line of posts. From there it was just a matter of a steady yo-heave-ho on the connecting rope. Landing on the comparatively firm earth of the causeway, we abandoned our argosy to the mud and the next windblown rise of Salton Sea. Here, two hundred feet below the level of the ocean, I was content to bring my Colorado River voyagings to a close for the season.

PART IV

DOWN THE GRAND CANYON

CHAPTER I

PREPARATIONS AND THE START

JUST as the middle canyon region of the Colorado River was the last extensive area in the United States to be explored, so also was it the last to be accurately surveyed. Over half a century elapsed between the completion of Powell's second expedition in 1872 and that of the United States Geological Survey of 1923, yet in all of that time very little addition was made to the remarkably comprehensive observations recorded in the reports of the pioneer explorer. Robert Brewster Stanton's Grand Canyon voyage of 1890 resulted in a complete photographic panorama of both walls of the great gorge, with detailed notes bearing on the practicability of constructing a railway line therein. Only a small portion of this valuable record has been published up to the present, however, and the same is true of that of the voyage of Julius F. Stone in 1908. Mr. Stone is one of the clearest-minded observers ever to make the canyon voyage, and the publication of his earnest studies, scientific and navigational, would have gone far to fill in the otherwise almost blank thirty years between Stanton and the recent Geological Survey expedition. There were, it is true, a number of other voyages through the Colorado canyons in the course of these three decades, but with the exception of that of Stone

all were undertaken by trappers, prospectors or photographers for the purpose of personal gain rather than scientific observation.

This explains why the only maps of the Grand Canyon region in existence up to the time of the recent expedition were based very largely upon Powell's work, and why the fifty-year-old records of the Powell voyages were still the most comprehensive available as a navigational guide. Probably the work of no other explorer of the nineteenth century —not even that of Stanley and Livingstone in Africa —had survived a period of fifty years with so little modification from the observations of those who followed. This was partly due to the fact that Powell's work, considering the difficulties under which it was performed, was extremely well done, partly to the fact that few if any of the pioneer's successors were so well equipped as was he in the natural gifts for scientific exploration.

The reason that so little was done in the way of scientific exploration of the Colorado canyons in the half century following Powell's voyages is to be found in the fact that there arose in this period no great need of data not already made available by the first explorer. When such a need did arise—in connection with plans for the control of flood waters and for irrigation and power development—the time had come for the resumption of the navigation by scientific explorers. Because Powell was largely responsible for the founding of the Geological Survey in the first place, it was peculiarly fitting that it should be the Survey that should take up and finish

the work which the pioneer explorer of the Grand Canyon had initiated fifty years before.

The work of the Geological Survey in the Colorado River Basin dates back to 1888, when studies were begun for the Federal irrigation projects, later taken over by the Reclamation Service. Special surveys, showing plans and profiles of streams with incidental topography, were begun in 1909 and have been continued uninterruptedly ever since. With the completion of the Grand Canyon survey in October, 1923, these maps are continuous from Green River, Wyoming, on the Green River, and from Grand Junction, Colorado, on the Colorado (formerly the Grand), to the boundary of Mexico. Many hundred miles along the principal tributaries have also been surveyed.

Wherever possible this work was done by land parties. Extended sections of the canyons, however, could only be reached from the river, and for the surveying of these boating expeditions were necessary. The gorges of the Green, San Juan and Cataract Canyon were surveyed in 1921 and 1922. This left only the surveying of the continuous gorge of Marble Canyon and the Grand Canyon to close the gap. This work was definitely decided upon in the fall of 1922 and preliminary organization was initiated as soon as the necessary appropriations were assured.

Lieut. Col. Claude H. Birdseye, Chief Topographic Engineer of the Geological Survey, was named to organize and head the Grand Canyon expedition. With the surveying of Mount Rainier, the

crater of Kilauea in Hawaii and other notable field work to his credit, Col. Birdseye was especially well fitted for the arduous task in hand. Of equal importance was the fact that he had already established a reputation as an organizer of outstanding ability. Lack of organization had wrecked more canyon navigators than the rocks in the river; proper organization was the one best insurance against disaster. With this well-established fact thoroughly in mind, Col. Birdseye was engaged all winter and spring on the endlessly ramified details of outfit, personnel and schedule.

The theory upon which Col. Birdseye worked was that every man and everything essential to the success of the expedition should be included, and that every man and everything not essential should be excluded. This line—a hard one to draw, especially in the matter of much that was desirable in a precautionary way in the event of trouble—was well maintained from first to last. The one hard and fast limitation was that of space, and when the number of boats to be taken was finally decided upon, that could be figured out in cubic feet.

To do the work outlined for the expedition three technical men besides Col. Birdseye were deemed an irreducible minimum: a topographic engineer, a hydraulic engineer and a geologist. A rodman, a cook and a boatman for each of four boats brought the number of the party up to ten. In emergency the expedition could carry on with one or two less than this number, but only by throwing a disproportionate amount of work upon some of the others.

The outfit then, general and personal, was planned for ten men travelling in four boats. As a boat had to be sufficiently small and light for one man to handle alone in rough water, with a full load and carrying one or two passengers on the decks, the puzzle of stowage seemed a baffling one. Col. Birdseye was only sure it had been worked out when the last bag and man was aboard at the initial push-off from Lee's Ferry.

Satisfactory waterproof bags and boxes were made only after months of tentative trials and experiments, during which all of the tubs and sinks and basins in the Geological Survey wing of the Department of Interior building served their turns as testing tanks. The best protection for bedding, duffle and provisions such as flour, sugar and dried fruit proved to be an inner sack of rubber, covered with an outer one of waterproofed canvas with a double tie. An attempt to make water-tight instrument and camera boxes from galvanized iron was a failure, principally owing to the tendency of the metal to bend under pressure. Further experimentation resulted in a highly serviceable wooden box, the cover of which was held down upon a rubber gasket by brass catches. Practically everything in the outfit was selected by test and comparison from the best that could be bought or made.

An invaluable piece of research work was carried out by Hermann Stabler, Chief of the Land Classification Branch of the Geological Survey, in studying all available reports and accounts of previous voyages and compiling therefrom a manual of nav-

igational information. This gave mileages, estimated falls of rapids, and any data available as to how they had been passed by the various voyageurs. By far the most complete record proved to be that kept by Frederick Dellenbaugh of the second Powell expedition, but as this finished at the mouth of the Kanab only about half of the Grand Canyon was covered. Excerpts from Powell's report of his first voyage were also included in Mr. Stabler's interesting record, as well as notes from those of Stanton and the Kolbs.

The party assembled in Flagstaff, Arizona, on July 15th. The foremost men in their respective lines had been chosen for the technical work of the expedition. As topographic engineer assisting Col. Birdseye, R. W. Burchard was appointed. Mr. Burchard's right to the distinction of running the river line in completing the Grand Canyon survey was earned by the notable work he had already accomplished on the Colorado. This included the survey of the Boulder Canyon dam-site as well as most of the river between the foot of the Grand Canyon and The Needles; also thirty-five miles at the lower end of the Grand Canyon itself. The latter was an especially outstanding feat both of engineering and navigation, as we were to learn later. Of powerful physique, great endurance and a cool, steady head, Burchard was an ideal man for all phases of the rough work ahead.

Equally fortunate was the selection of R. C. Moore of the University of Kansas as the Geologist of the expedition. Dr. Moore owed his appointment to the

fact that he was the acknowledged first among available authorities on the geology of the middle Colorado canyon region. A former college athlete and a veteran of many a hard summer of field work in the desert west, he was in prime shape physically and almost tireless under the hardest kind of exertion. As an entirely competent engineer, able to do anything from carrying a rod to running an instrument and recording, he was perhaps the most valuable utility man in the party, especially after a month's experience in the rapids had developed him into a really capable river-rat. As a passenger in my boat for the entire run through the canyons, ever ready to help in landings, linings, portagings, upsets, or anything else eventuating in the course of the day's work, my personal obligation to Dr. Moore is a very real one.

The hydraulic engineer of the expedition was E. C, La Rue of the Water Resources Branch of the Geological Survey, who qualified for that appointment through many years of specialization on Colorado River problems.

The boatmen of the expedition consisted of two trappers and rivermen from the Northwest by the name of Blake and Lint, Kolb, a Grand Canyon photographer, and myself. Dodge, the rodman, was also a competent boatman, quite the equal of any of the others with the oars and by long odds the best swimmer in the expedition.

Roger Birdseye, cousin of the Colonel, had been appointed to the very important position of "Land Manager" of the expedition. Formerly a banker in New York, he had enlisted in the Canadian army at

the outbreak of the war, had been gassed and badly wounded at Ypres, and was now trying to give his lungs a chance in the high dry air of northern Arizona. He had been receiving the odds and ends of outfit as they were shipped in during the previous weeks, making local purchases and looking after the interminable details of preliminary arrangements. After our departure he was to pack in supplies, mail and anything else necessary to meet the party at successive points where the foot of the canyon could be reached by trail. This work, which became one of increasing responsibilities and anxieties as the weeks went by, was carried out with the greatest energy and judgment to the end. With the possible exception of the Chief himself, no member of the river party worked harder or contributed more to the success of the expedition than its indefatigable "Land Manager."

Three of the boats to be used by the expedition were already at Lee's Ferry; a fourth, built at Los Angeles Harbor, was awaiting us at Flagstaff. A cradle of heavy timbers was built on the truck to relieve the strain on the latter craft during the hundred-and-thirty-mile run over ungraded mountain and desert roads to the river. With ten feet of overhang behind the truck, men had to ride the radiator on the climbs to keep that vehicle from rearing up like a balky horse. A second truck and two autos carried the remainder of the party and outfit. Leaving Flagstaff at noon of the 18th, we camped that night at the Cedar Ridge trading post of the Navajo Indian Reservation. Pushing on from here early

the following morning, some delay was occasioned by the necessity of repairing washouts from a recent cloudburst in the road along Tanner's Wash. In spite of the tendency of the overhanging tail of boat to wag the truck, little real trouble was encountered.

The gorge of Marble Canyon was as baffling as ever in its concealment as we approached it across the plateau. It was impossible to say with certainty —judging only from what met the eye—that even so much as an arroyo or gully intervened between the road and the wall of the Vermillion Cliffs towering against the northwestern sky. Yet the ever-deepening chasm of the world's most profound canyon was at times less than a mile distant from our winding desert track.

At the old Mormon "dugway" we were confronted with the alternative of unloading the boat and taking it down to the river by a long-disused stretch of grade or trying to run it through on the truck. Fortunately, we decided upon the latter. Notwithstanding the fears of the driver that the boat was too long for the shelving curves it rode through with plenty to spare. It would have been a tedious task to line it up to the boat-house from below the mouth of the Paria.

Camp was made at the boat-house of the Southern California Edison Company, on the right bank of the river just below the cable ferry. One hundred and fifteen, Fahrenheit, in the shade, with considerable humidity, was somewhat trying after the exhilarating mountain air of Flagstaff. As this was the sort of thing to be expected for the next month and

half, however, there was nothing to be gained by waiting for a cooler spell. Clearing the boat-house, we set to work at once reconditioning the craft which the Southern California Edison Company had placed at the disposal of the Survey for the canyon expedition. The three boats were found to be in fairly good condition considering their long exposure to the sun and dry air since they were used in Cataract Canyon two years previously. The end-of-the-day plunge in the river initiated that evening after work was over became an established feature for many weeks. The water was red with mud at its clearest; but it was a clean sort of mud, as mud goes, and disentegrated freely before vigorous towelling. Until we were far enough down-river to be exposed to the liquid filth poured out by the floods of the Little Colorado our evening, morning and interim dips were really refreshing.

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The mouth of the Paria, from where our start was to be made, is one of the most historic points on the Colorado. Fray Escalante, searching for the ford which has since been called "The Crossing of the Fathers," camped there in 1776, vainly seeking a way to reach the left-hand bank of the Colorado. The "great grey cliff" where his party starved on horse-meat and toasted cactus fruit is readily recognizable. James Pattie, the trapper, passing here in the middle 'twenties, expressed his relief at coming out even temporarily from "the horrid mountains." Powell, making an overnight camp at the Paria in early August of 1869, pushed off into the depths of

GRAND CANYON PARTY AT LEE S FERRY

COMANCHE POINT AT SUNSET

Marble Canyon the following morning on the final stage of his pioneer voyage. He met neither Indians nor whites in the valley at that time, but three years later his second expedition found the Mormon renegade, John D. Lee, farming a patch of fertile overflow land above the ford which still bears his name. Lee was a fugitive from justice, being widely sought by the Federal authorities at that time as the instigator of the Mountain Meadows Massacre of 1857, a crime for which he was finally tried, found guilty and executed. Dellenbaugh writes in delightful vein of the way in which he and one or two other of the younger members of the second Powell party helped Sister Emma (Mrs. Lee XVIIIth) irrigate her melon patches, and of how Jack Hillers got no end of a rise from the nervous fugitive by cocking a gun behind him during Lee's Sunday sermons.

The Brown-Stanton party, surveying for a railroad through the Grand Canyon, halted and refitted at Lee's Ferry in July, 1889, after losing much of their very inadequate outfit in the rapids of Cataract Canyon. Three of the eight men of the reduced party were lost within a few days of putting into Marble Canyon, forcing the temporary abandonment of the expedition. Stanton's reorganized outfit had Christmas dinner at the Ferry six months later before resuming the uncompleted survey. A few days later that indomitable leader was back again, this time to seek help to bring out his photographer, who had broken his leg by a twenty-foot fall.

No place on the river has the power to awaken

more memories of the past than Lee's Ferry, but strangely little that can be touched save by the imagination remains. John D. Lee's first log-cabin and his four-ways lookout on a point above the Paria are still there, but all we ever found that pointed to one of the early navigators was the name HISLOP, pricked in large block capitals on the red sandstone of the house now occupied by the Government hydrographer. That could only have been the stout Scotch engineer, John Hislop, Stanton's right-hand man on both voyages. Hislop, after surviving the passage of the Grand Canyon rapids and several years in pioneering railroad work in Alaska, was finally killed by a street-car while home on a vacation.

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The four boats to be used on the expedition, while differing slightly in size and details, were all of the flat-bottomed, decked-over, one-man type that is appropriately called the Galloway-Stone. The somewhat crude original was designed and built by Nathan Galloway, a Mormon hunter, for use on his lonehand trapping expeditions to stretches of the upper Colorado canyons not reachable except by boats. On the very sound theory that it is better to avoid a rock in a light boat than to hit it with a heavy one, Galloway sacrificed strength for handiness, but built a boat which he repeatedly ran single-handed through rapids in which the large, heavy boats of Powell and Stanton had encountered much trouble.

When Julius F. Stone, an Ohio manufacturer, scientist and sportsman, decided to make a voyage to photograph and study the geology of the Colorado

River canyons in 1909, he had Galloway come to his home in Columbus, where the two men put their heads together to build an ideal boat along the lines of that already used with such success by the Utah trapper. The present type of the Grand Canyon boat was the result. It was entirely decked over except for a cockpit for a single oarsman, and weighed less than 250 pounds. Its length was sixteen feet, four inches, its beam forty-six inches and its depth sixteen inches. The material was Michigan white pine, five-eighths of an inch thick. The four boats of this type built to Mr. Stone's order were used with signal success on his voyage through the canyons. The run from Green River, Wyoming, to Needles, California, was made in one week over two months. Both Stone and Galloway brought their boats through all the way without an upset and with but a single light collision each while under control of the oars. These are by long odds the best records ever made in the Colorado canyons, both for time and for skilful boatsmanship.

When the Kolb brothers were planning their picture-taking voyage through the Colorado canyons in 1911 Mr. Stone furnished them with blue prints of the design of the boat which had served him so well. Desiring a boat of greater strength, the photographers retained the original dimensions but doubled the weight by using heavier materials. Without greatly decreasing handiness they materially increased power to withstand punishment. This boat weighed five hundred pounds. Ten years later when the Geological Survey and the Southern Cal-

ifornia Edison Company planned a joint expedition through Cataract Canyon, boats of larger dimensions were needed to carry heavy outfits. Still retaining the lines of the Galloway-Stone original, eighteen-foot boats were built, with proportionate increase of depth and beam. These weighed close to eight hundred pounds and must have had not far from double the cargo capacity of the early prototype. The fleet assembled for the Grand Canyon expedition consisted of three of these eighteen-foot boats and a lighter one of slightly different lines having a length of sixteen feet.

One of the many interesting things that the coming voyage was expected to reveal was to whether or not in the building of this comparatively heavy cargo and passenger-carrying boat there had been too great a departure from the original Galloway-Stone idea of a craft of extreme lightness and handiness. The latter weighed 243 pounds and was built to carry a comparatively light load and one man—its oarsman. The boats we were about to use were over three times as heavy as this, carried at least twice the weight of cargo and were expected to find place for three men. That is to say, there had been an increase of upwards of 700 per cent in weight without any increase of power. The latest boat had still to be handled by a single man. Whether the demand was too great—whether too much handiness had been sacrificed for carrying capacity and strength —remained to be seen. The Powell and Stanton boats, it is true, were larger and heavier than these of

ours, but they were manned by a minimum of three men each—two rowers and a steersman.

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Thirteen days were spent at Lee's Ferry getting ready for the voyage. This was mostly taken up in reconditioning the boats, testing instruments, life preservers and various other articles of the outfit, and a considerable amount of preliminary surveying. Recoppered, recaulked and repainted, the used boats appeared tight and thoroughly serviceable. A folding canvas boat, to be used by the rodman and to have below rapids in the event of trouble, seemed to promise real usefulness—as long as it lasted. Of the several designs of life preservers provided, the old cork type was the only one giving any great amount of buoyancy. Stuffed kapok jackets and inflatable rubber girdles just about kept a man up in quiet water. The two worn in combination lifted him higher but were scarcely less bulky than cork. Real freedom for rowing action in a life preserver was a problem which would have to be worked out by experience. Something of the kind had to be worn in every bad rapid—that was the Chief's order, and a very sensible one.

A receiving radio had been included in the outfit for two reasons: on the chance that it might bring us warning in the event of a flood descending from above and as a possible source of entertainment. The publication of an article in a prominent radio magazine the week we left Flagstaff provided a new line of interest. In this it was stated quite definitely

that it was impossible to receive radio in any deep, sheer-walled natural depression. As we were about to enter the deepest gorge of this kind in the world an unparalleled opportunity would be offered to put this theory to the test. In spite of the interference of daily thunderstorms and the terrific heat radiation from the Painted Desert, our set gave good service from the day it was set up at Lee's Ferry. The broadcastings of KHJ of the *Los Angeles Times* always came in the clearest, but on several occasions we had stations as far east as the Drake Hotel in Chicago. We had only four ear-pieces, but a magnavox improvised from a baking powder can and a tin funnel offered entertainment for a wider audience on occasion.

Nomenclature of the boats was a serious question, but after much discussion we decided to base it upon Colorado River canyons—gorges which we were to touch or pass through on the voyage. The new boat was called *"Grand,"* the other two eighteen-footers *"Glen"* and *"Marble,"* and the sixteen-footer *"Boulder."* The canvas boat received the name of *"Mojave."*

To the *Glen* was allotted the duty of carrying the cooking outfit. Blake was to be boatman and the cook passenger. The *Boulder* was designated as survey-boat, to be handled by Lint, with Birdseye and Burchard as passengers. The *Grand* was given to me to handle, with Moore and La Rue as passengers. Besides geology and hydraulics, we were to specialize on pictures. La Rue had a small moving picture machine and two or three ordinary cam-

eras. I had two cameras, to be used where they did not interfere with my boating work. Kolb, with the *Marble,* had no passenger at the outset. Dodge was to carry the rod in the *Mojave.*

Of the four regular boatmen, Lint, Kolb and Blake had put in several seasons of work in the Galloway-Stone boats; with some little previous rough water experience, I pulled an oar in this type of boat for the first time. Dodge rowed well and was still more at home in the water. Of the engineers, Birdseye, Moore and La Rue had done some rowing. Both the Chief and the geologist had good natural water-sense and took to the river like ducks. Before the voyage was over either would have qualified for a boatman's job had the occasion arisen.

A line on the multifarious needs of an expedition such as that upon which we were about to embark may be gained from a list of last-minute purchases which Roger Birdseye drove out to make in Flagstaff the last week in July. Although six months of study and thought had been put into the outfit which was supposed to be complete when we came in a fortnight previously, there were something like a hundred separate items that it proved desirable still to secure. Another formidable list was made up of things to be brought down to meet us at the foot of the Hance Rapid, below the mouth of the Little Colorado. The ability to secure necessities of every description in so comparatively short a time was the one great outstanding advantage that the late expedition had over those of the earlier Colorado Canyon navigators. Powell's first party was able to replenish

supplies only once after the start from Green River, Wyoming, and the second party only three or four times.

As the time for starting approached it became evident that we must expect to cope with unseasonably high water. The river, which Mr. Cockroft, the Government hydrographer, reported as flowing from 30,000 to 35,000 second-feet during our first week at the Ferry, was still holding up around 25,000 second-feet at the end of the month. This was well above the normal for that time of year. Just how this would affect navigation for us was problematical. Generally speaking, extreme low water is considered the safest, especially where there is much lining or portaging to be done. With our heavy boats and loads, however, it seemed quite possible that well-filled gorges and deeply covered rocks might be desirable. This, like a number of other things, remained to be seen.

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After packing and shaking down outfit most of the 31st of July, we were ready for an early start on the morning of the 1st of August. The mountainous piles of supplies on the bank looked equal to taxing the carrying capacity of a deep-sea-going freighter—enough to swamp our diminutive shallops many times over. But the holds of the latter admitted an astonishing amount of cargo by careful stowing, and we finally took everything needed without having to remove the safety air-tanks to give further room.

With their full loads all four boats were well down in the water, especially the *Grand* and the *Boulder*

which were carrying two passengers each. My boat seemed strangely heavy and slow in responding to the oars as we swung out into the current, but that was partly from the contrast to the way it had handled empty. As loads were the rule from now on there was nothing to do but become reconciled to them. Every little while somewhere between a ton and a ton and half of boat, cargo and men would have to be moved far enough one way or the other to avoid colliding with a rock or a cliff. If they were not—well, it was notorious from the experience of previous voyageurs that rocks can stand a deal more punishment than boats or loads or men.

It was a morning of bright sunshine on the river, but above the gay slash of the Vermillion Cliffs piles of snowy cumuli were gathering for the afternoon thunderstorm. To the south the terra-cotta walls of the Echo Cliffs were etched with the cross-lights of the early sun. Astern of us the yawning mouth of Glen Canyon was a pool of purple shadow; ahead the portal of Marble Canyon was the beginning of a black gash cleaving the plateau like the wound from a giant's kriss.

> "Out of the dark and into the dark,
> With only a sleep between—"

How well the lines described Powell's overnight camp at the mouth of the Paria! Even a boat that was showing an annoying tendency to work in toward the cliff below the old Mormon dugway could not quite take my mind off the pioneer canyon nav-

igator at that moment. He had found easy going in the long quiet reaches of Glen Canyon, but ahead was the Unknown in the most sinister aspect it had yet assumed. He was too good a geologist not to read the warning in the changing formations, for he wrote:

"With some feeling of anxiety we enter a new cañon this morning. We have learned to closely observe the texture of the rock. In softer strata we have a quiet river; in harder, we find rapids and falls. Below us are the limestones and hard sandstones we found in Cataract Cañon. This bodes toil and danger."

To none of the later parties, including our own, can the menace of the canyons ahead have seemed what they were to Powell. We had the same rapids to face, to be sure; but their position was fairly well charted and we knew that, in one way or another, they could be passed without prohibitive risk. We had ample food supplies and repairs, with replenishment always waiting a few miles ahead. Powell ran the whole length of the canyons of the Colorado with the shadow of the Unknown just ahead, and all of the Grand Canyon with the spectre of Starvation clutching with grisly hand at the steering oar.

CHAPTER II

THROUGH MARBLE CANYON

As we dropped down past the old stone houses of the Hydrographer's station, Cockroft paddled out in his canoe and delivered a parting gift from his wife in the form of a cake. It bore some sort of a farewell message in white frosting on pink, all the letters pegged on with toothpicks to keep them from slipping when they melted in the mounting heat. There was plenty of water in the long riffle below the Paria, so that we were able to pass on either side of the big midstream boulder sometimes called "The Battleship." The waves slapped a bit of spray over now and then but were not at all rough. Just below the dugway, where the first outcropping patch of limestone marked the beginning of Marble Canyon, Birdseye and Burchard landed and began work by tying the river line into the completed survey from Glen Canyon.

The rate at which Marble Canyon burrows its way into the bowels of the earth never fails to astonish the voyageur entering it for the first time. The uprearing of the walls is due both to the rapid rise of the sundered plateau and to the fall of the river—mostly to the former. The river drops at the rate of about ten feet to the mile, or two hundred feet in twenty miles. At a distance of twenty miles from

the head of the canyon the walls are 2,000 feet above the river, having risen at the average rate of a hundred feet to the mile. Thus it would appear that, in this section of Marble Canyon, nine-tenths of the height of the walls is due to the rise of the plateau and one-tenth to the descent of the river.

The first formation to show at the head of Marble Canyon is limestone (dolomite) but a narrow stratum of Supai sandstone soon began to push up along the water-line. The dolomite has weathered to a greyish-pink, but shows dun-green at the fractures of recent slides. The Supai is ox-blood and chocolate—most of the colour from iron stains, according to Moore.

At three miles from the Paria we stopped to look over the first riffle of any size in the canyon. Some rocks showed at the surface near the head on the right, but were easily avoidable. The boats bobbed through at a lively rate, but without taking much water. We tied up for lunch at a so-called bridge-site a mile farther down the river. There is a narrow section with abrupt walls nearly 500 feet in height on either side. The bridge plan is an Arizona project for linking the two sections of that state now almost inseparably divided by the Grand Canyon. If the structure is ever built it will have no rival in height for a long time.

After running another small riffle, a half mile pull in quiet water brought us in sound of a heavy roar which we knew to be that of Badger Creek Rapid. We came in sight of it twenty minutes later: an up-tossed riffle of grey foam (the Colorado's muddy

current never froths white) beyond which the river dropped completely from sight. Pulling in cautiously, we landed in a quiet eddy behind three large rocks, where a clean white sandbar offered an attractive camp. We were just starting down to look over the rapid when a gathering thunderstorm broke in a heavy squall and we were forced to seek shelter under projecting rocks. Thunder is never so impressive as between sheer rocky walls; likewise an incipient cloudburst, especially when it puts down enough water to turn the opposing canyon rims into twin Niagaras. One soon learns to seek his shelter away from low drainage depressions or under those parts of the cliffs stained black by transient storm-fed waterfalls. A deep under-cut cave in the sandstone or limestone is the best shelter, provided it has no back entrance.

Powell had portaged boats and outfit around Badger Creek Rapid on both his first and second expeditions. Stanton had done likewise, both with the Brown party boats and those of his own expedition. The Kolbs had run with both their boats but had struck a number of rocks in the course of a very bumpy passage. We were hoping to run if the stage was at all favourable.

Nine-tenths or more of the rapids in the Colorado River canyons are formed by dams of boulders washed out of side creeks. If the section where this occurs is a narrow one the barrier will extend all the way across, usually making the resultant rapid steep and violent. In a broader section there may be room for the river to swing round the outer curve of the

boulder fan with a comparatively unobstructed channel. At Badger Creek Rapid the dam thrown out from the canyon of that name has been reinforced and heightened by the cloudburst discharge of a small unnamed canyon immediately opposite.

The rapid appeared decidedly rough as we looked it over where it rumbled and tumbled in the deepening shadows of the cliffy walls above. From the right bank it was difficult to fix upon a course where a boat could be certain of avoiding rocks all the way through. From an elevated vantage on the left-hand cliff the passage was more chartable. For two-thirds of the way across from the right bank the fall over the boulder barrier was too abrupt and too broken to give a boat a fighting chance of surviving a run. Then a deeper V of hard running water cut through before the impassable boulder wall resumed again. The channel through the V was closely beset by rocks from the very head, while half way to the foot of the rapid it led directly over a shallowly submerged boulder into a hole so deep that the bottom could not be plumbed with the eye. This would have to be avoided after dropping through the channel at the brink of the fall. There were several places where it was possible for a boat to get into trouble; but with reasonably good luck and handling there did not appear enough risk to warrant resorting to the only other alternative—portaging boats and loads over two hundred yards of slippery boulders. The Chief signified that he was willing to risk the boats if the boatmen were game to take a chance at a wetting.

Half the battle in running a rough and rocky rapid is to put the boat into the head at the most favourable place. In many instances that—and keeping the boat head-on to the current and waves—is almost all that is necessary. The simplest way to test the set of the current is to toss driftwood in above and watch its course through the broken water. When this was tried as a preliminary to running the following morning the drift sent down the V at the head carried straight into the deep hole half way down to the foot. This meant that sharp pulling would be necessary to keep a boat from plunging into what appeared to be a place of real danger.

The preparations for this first run were made with considerable care. All cameras, instruments and the radio set were kept out and carried to the foot of the rapid. The remainder of the loads were carefully trimmed before screwing down the hatches. Oarlocks were wired in to prevent the loss of oars in case of an upset and bailing buckets were secured on short lengths of line. Nothing was left loose in the cockpits save the boatmen. The canvas boat was carried to the foot of the rapid and launched to be ready in case of need.

The opening run was far from auspicious. Kolb dropped into the V just as planned so far as avoiding the big boulder on the left was concerned. He missed this by half an oar's length but failed to reckon with a slightly more deeply submerged rock just below. The *Marble* was not upset or hung up by the obstruction, but the blow dealt the bottom threw it partly out of control and prevented effective

pulling. Swung half sidewise, it drifted over a rounded wave and dropped into the deep hole that all the strategy had been directed to avoiding. Almost disappearing in a cloud of spray, the *Marble* reappeared an instant later, partly filled but still riding buoyantly. Too far out to make the foot of the rapid on the right where the cameras and instruments had been portaged, Kolb pulled in and landed in an eddy against the opposite bank.

Lint, following next in the *Boulder,* hit the V just right and pulled away from the rocks with plenty to spare. In drifting down, stern-first, to the head, I took the *Grand* a few feet too far to the left and was carried back upstream along the bank. Circling round and pulling out of the backwater, I swung to the middle of the current and dropped down to the brink of the fall again. The abruptness of the descent made the opening impossible to see until one was almost upon it, and then only by standing up. Once the V began to open up, I sat down, pulled hard against the current setting toward the jutting rocks and slid over the top. The jolt of the first wave was a solid one and there was real weight in the piece of it that came bounding over the stern against my chest. Missing a stroke or two before recovering, I let the *Grand* swing quartering over the next comber, but had no trouble in bringing its head back upstream again and pulling well clear of the bad hole.

Blake, running last, was drawn somewhat to the right of the V, dropping down into a broken wave that swept completely over the *Glen,* hiding it from sight for all of a second or two. It was in rough

FLASHLIGHT OF RADIO IN MARBLE CANYON

A PLACID STRETCH OF UPPER MARBLE CANYON FROM THE RIM

water for the next hundred feet, and then came out under good control.

When Kolb came to examine his boat he found that the after hold was several inches deep in water. Investigation showed that the bottom had been holed near the bulkhead, doubtless by the rock hit at the head of the rapid. Sugar, salt, oatmeal and other things not in rubber sacks at the moment were wet, and considerable water had penetrated to the supposedly watertight map-cases. Fortunately none of the sheets of the new survey had yet been transferred to the cases. Had water entered the latter at any later date the damage would have been irreparable. Because the new boat, the *Grand,* had a stronger bottom than that of the *Marble,* the map-cases were transferred to its forward hold for the rest of the voyage. As drying out the saturated sheets and repairing the hole in the *Marble* delayed us for an hour or more, we lunched at the foot of the rapid and did not push on until after the repast.

Powell had estimated the fall of Badger Creek Rapid to be eighteen feet, while the Kolbs put it at twenty. Burchard's survey made it thirteen. Ours was the first voyage on which the fall of the rapids of the lower Colorado canyons was measured with precise instruments. From beginning to end the earlier estimates were found to be far too liberal. A guess at the fall of a rapid is almost invariably too high. The fall of a river in a given distance varies slightly between high and low water, it is true, but not enough to account for the difference between the actual descents and the estimates of earlier voya-

geurs. Moreover, both of Powell's voyages were made at approximately the same water-stage as was that of the late survey.

The walls of the canyon, which were 730 feet above the river at Badger Creek, increased steadily in height as we proceeded, with an ever broader streak of maroon-chocolate Hermit Shale showing as we penetrated deeper into the gorge. About two miles below Badger Creek we came to a striking monument of dolomite in the middle of the river. It looked solid enough to be an outcropping of bedrock, but could only have fallen from one of the higher formations. As it is not mentioned by previous navigators, and as the fracture from which it appears to have come has not weathered greatly, it is probably of very recent origin.

Opening up a long, straight stretch of canyon running east-and-west, we landed to photograph a great rectangular cliff which towered against the skyline, revealing breaks at both ends, neither of which was positively identifiable as the course of the river. A heavy roar became audible as we neared the bend, indicating the presence of a major rapid that we knew could only be that below Soap Creek, a mile or two nearer to Badger Creek than was shown by existing maps. An extensive fan of white boulders (limestone) completed the identification of a rapid bearing one of the worst reputations on the Colorado. Landing, we picked a camp-site on the right bank a hundred yards above the break of the fall.

There is ample room to portage on the boulders to the right of Soap Creek Rapid, and both Powell

expeditions had avoided the savage tumble of rough water in that way. The railroad surveying party of 1889 also portaged their boats round the main fall, but shortly after launching them in the swirling waters below an upset occurred in which Brown, the president of the company, was drowned. Stanton did not attempt to run the main rapid when he came along in 1890, and Ellsworth Kolb in trying to do so suffered successive upsets with two boats. This sinister record has given Soap Creek Rapid a bad name, rather worse than it deserves.

At first sight Soap Creek Rapid, while plainly of a greater and more violent fall than that of Badger Creek, looks no more dangerous to run. This is probably because the entering V is more clearly defined than in the rapid above and leaves but one course open; also to the fact that the boulders under the great waves at the head are deeply submerged except at extreme low water. We loaded up in the expectation of running the following morning, but at the last moment Kolb returned from a trip across the river to announce that he considered it too risky —that he believed a boat would be almost certain to upset in one of the first two waves, and after that to drive upon rocks not visible to us from the right bank. There was some disappointment at missing the chance to attempt what might have been the first successful run of this notorious rapid; at the same time, however, there would have been no point in taking undue risks with an outfit like ours, especially so early in the voyage.

The portage was a short one, and the method of

effecting it the same in the case of each boat. *Glen,* the cook-boat, was the first to go. It was taken down a couple of hundred feet under oars, lined another hundred feet farther and unloaded. It was then lined empty fifty feet more to the head of the portage. This was across large boulders, over and between which large logs were laid at frequent intervals to prevent the sides of the boats from being crushed in as they were slid down. It was heavy work, yet not so punishing as it would have been with fewer men available.

Sliding the boat down over a five-foot waterfall to a quiet pool at the lower end of the portage, it was launched and reloaded. Backing it out of a sort of natural portal between two large rocks, the rapid was entered on the right, just below the two big waves which it was desired to avoid. The next two hundred yards was a rough but not dangerous run. Pulled into an eddy to a beach along the right bank, the *Glen* was unloaded. The *Grand* was brought down while dinner was cooking, and the two remaining boats in the afternoon. After the last one was tied up there was still time for a cooling swim and a rest before supper.

Radio had come in as strongly as ever at Badger Creek, but it remained for the thousand-feet-deep section at Soap Creek to furnish a conclusive proof of the utter fallacy of the theory that so profound a natural depression cannot receive from a distance by air. Station KHJ had warned us the previous night that it was planning to broadcast us a special lot of messages the evening of August 2nd. That was the

night of our arrival at Soap Creek. In preparation for the gala occasion the aerial was carefully set up with one end high on the side of a cliff and orientated on Los Angeles. KHJ came in clearly promptly at 9 o'clock, Mountain Time, with little interference either from static or the crashing roar of the imminent rapid. The lightning of distant thunderstorms was jazzing up the purple wedge of sky between the up-river cliffs but, strangely enough, with scarcely any reaction on the instrument. Baseball scores had come in and the daily grist of news was half way through, when there was a sudden break, followed by a brief space of charged silence. When the announcer resumed, it was to state in a voice of very evident emotion that news had just been received of the death of President Harding in San Francisco. This word was winged a dozen times or more during the next hour, once directly addressed to "the engineers braving the rapids of the Colorado." We had received our special message, though not the one expected.

The first news of the President's death was received about 8.15, Pacific Time—perhaps forty-five minutes after the event. Not one in ten thousand of the city dwellers of the country could have had the news at so early a moment. Col. Birdseye announced at once that a day of rest would be taken by the expedition out of respect to the memory of the President. The exact date would be decided later when the day of the funeral was learned over the radio. Almost unconsciously the radio had come to be accepted as a regularly functioning unit of the

outfit. Although occasionally affected by heat and local electrical storms, it continued to work just as well when the gorge of the Grand Canyon had deepened to a mile as it did the night it brought us the momentous message in the camp at Soap Creek Rapid. That it failed to pick up the many warnings that were broadcast to advise us to be on the watch for an impending flood was not the fault of the outfit. It was enjoying a temporary rest while fresh batteries were being sent in.

The fall of Soap Creek Rapid was found to be eighteen feet. Earlier explorers had put it at twenty-five, with waves twelve feet high. The latter estimate is conservative, especially as regarding the two big waves at the head of the first steep drop. The waves of rapids are very difficult to measure. Estimates of the height of many we ran or narrowly avoided varied considerably even among the engineers of the party.

We pushed off below Soap Creek Rapid early on the morning of the 4th. The tail of the rapid ran on for a quarter of a mile into another riffle where, at a sharp right-angling bend, there began a long winding stretch of canyon filled with deep surging water. The swirls and eddies were of great strength. The boats rolled heavily and at times were turned completely around. There were several swift chutes of hard-running water, though nothing to warrant the name of rapid so freely used by Powell in writing of this section. In this connection, Col. Birdseye decided to rate as a rapid nothing with a descent of less than six feet in a comparatively

short distance, exception to be made only in the case of places dangerous to navigate irrespective of fall.

There is no water for several miles below Soap Creek through which a well-handled open boat could not be run without serious danger. The fact that it was an upset which was responsible for the drowning of Brown, president of the company planning to build a railway through the Grand Canyon, is ample proof of the utter worthlessness of the boats of his party. The courage displayed by Stanton in continuing with so pitifully inadequate an outfit after the death of Brown is one of the finest things in Colorado River history. We were unable to fix quite definitely the rapid where a second upset cost the lives of two more of the Brown-Stanton party, nor could we be quite sure of Point Retreat, the place where Stanton cached the remains of his outfit and climbed out on the right side of the canyon. There are two or three small canyons which seemed to offer possible routes to the plateau, but Stanton's estimates of mileages did not correspond closely enough to the survey to make identification certain. The canyon which the second Stanton party followed in climbing out with Nims, the injured photographer, must also be very close to the one from Point Retreat.

At noon on the 4th we halted for lunch on a shelf a hundred yards above the head of a long and fairly rough rapid, the walls on both sides of which were so sheer that there was no chance of working along to reconnoitre. From the most favourable vantage point attainable the upper section appeared to be readily runable; a second riffle, disappearing around

a bend below, could only be guessed at. To Powell, on his first voyage, the place was one calculated to awaken serious apprehension, and he ran it only after working his boats down along the wall to the head by a very ingenious and intricate piece of lining. In our case, knowing the rapid had been run a number of times without trouble, there was little to give pause.

The *Grand,* held back to give a water-level reading to the instrument, was the last boat to start. La Rue, who was casting off the painter, slipped on the smooth rock and all but let us swing off into the swift current. As there was no chance of going back, either by land or river, we never quite worked out how the party would have recovered its hydraulic engineer had he marooned himself. The only menace in the rapid proved to be a barely submerged rock at the foot of the first riffle, and this was readily seen and avoided as the boats came down from above.

The canyon displayed points of rare beauty, with the Supai sandstone rising higher and higher from the water, and the Kaibab Limestone and Hermit Shale beginning to form a secondary wall behind. Many caves had been formed by the undercutting of the cliffs. Pulling back into one of these to await the instrument, we lounged for half an hour in its cool depths, singing lustily to while away the time. Amazingly mellow-voiced we all were, thanks to the softening effects of the cavernous echoes.

We ran a rough major rapid just before going into camp that night, and a second immediately after lunch the following day. Both were much like Soap

Creek in the way they rolled down steep pitches to under-cut curving cliffs of the left bank. All previous parties, including the Kolbs, had portaged at least one boat at the head of the latter rapid, which was somewhat more menacing from the fact that a second riffle began not far below to disappear in a tumble of broken water around the next bend. I had my first experience of the solidity of the bottom of the Colorado River at this point.

A heavy sandstorm was blowing out of the side canyon to the right as I drifted down to the head of the rapid, and in pulling against it I worked too far to the right and found the *Grand* dropping upon a bad mess of boulders almost under the bank. Hard pulling did not quite carry me back to the channel, and as a consequence a corner of the stern bumped solidly against a rock, allowing the boat to swing completely round. The *Grand* drove through the next couple of waves bow-on and then slid away from the heavy rollers under good control. Pulling across the current of the tail of the rapid, I beached the boat on the left bank, to find that it had suffered no damage from the collision. The *Grand* had the dryest run through of any of the boats; nevertheless getting in where I did at the head was not creditable, even in the face of a sandstorm. Pulling over to the right bank we picked up our passengers and pushed on down after the instrument. The riffle running round the bend proved a sloppy little affair, with about five feet of sharp fall. Burchard, riding through on the stern of the *Boulder,* came in for a good sousing here.

Moore called our attention at this point to the first showing of the solid stratum of Redwall Limestone. This began rising rapidly, just as had the Kaibab, Hermit and Supai in turn. The run of water was swift and continuous for the next mile, with the channel winding and sheer-walled and the frequent tumbling chutes followed by heavy swirls and whirlpools. Camp was pitched on a steeply sloping terrace of rocks and sand at the head of a big back-sweeping eddy. The sand was bound and held in place by the roots of salt-grass, very fresh and green in appearance. Room for our beds had to be cut with the spade out of the silt and sand. The bank from which mine was sliced had a sixty-degree slope to the river. Moore laid feet-to-feet with me, while the Chief kicked sand impartially on both of us from his niche above. Radio came in as strongly as ever in spite of the fact that the rim of the Kaibab now towered over 2,000 feet above us. There was a Sunday evening concert of real quality over KHJ; also an announcement that the date of President Harding's funeral had been fixed for the 10th.

From a boating standpoint the 6th of August was one of the liveliest and most eventful days of the voyage. Three or four major rapids and a number of riffles were run, in nearly every instance the head of one being in sight from the foot of the last. The total distance made was three miles, with a descent of fifty feet. This stretch has probably the heaviest fall in Marble Canyon.

As the *Grand* approached the second rapid with Moore and La Rue riding, Kolb, who had landed to

look it over, signalled me that it was all right to go on through. It was a straight run down the middle with no chance of hitting rocks—only big water. The opportunity to see what the boat would do in really heavy waves where there was no chance of banging it up was too good to miss. Sooner or later it would be swamped anyhow, I told myself, and it would be a good plan to find out what weight of water it would take to do it. Unfortunately, I was so confident of riding this particular chute without filling that I did not take the precaution of putting my camera under cover.

The middle V rolled over smooth and solid, like the brink of a real cataract, and it was not until we were almost at the upflung comber at the bottom of it that I had an inkling of what we were in for. The *Grand* had an easy rise to the first wave, and went through it without tearing more than a bucketful off the top. The next was a sidewinder from the right, however, and came banging over the quarter savage and solid. La Rue's writhing anatomy stopped a bit of it, but enough rolled on to fill the cockpit up to the seat. A third wave completed the job and left the gunwales awash. The rest of the rapid we went barging down after the fashion of a raft, with wave after wave sweeping us fore-and-aft.

As the water was warm there was no particular discomfort. The boat rolled much worse than normally, dipping a gunwale under at every roll; but she was still responsive to the oars and I had no trouble in bringing her into an eddy and up to the left bank well above the head of the next rapid. Ten minutes

bailing left the cockpit dry again. The water-tight box under the seat in which a part of our cameras were kept was as good as its name. The small camera, which had sloshed around the cockpit for a couple of minutes, was soaked and the film spoiled. Except for that, the experience was a valuable one in giving a line on the boat's limitations in heavy water; also as to its capabilities when filled. Plainly a swamping was a matter of no serious moment—with no bad rocks to be avoided below, that is. To me the incident was distinctly reassuring, though it took some argument to bring my saturated passenger on the after hatch of the *Grand* round to the same way of thinking.

The other three boats, with one passenger each, made the run through the rapid without incident. Dodge, with the canvas boat, capsized in the first wave, dropping out of sight for two or three seconds. Bobbing up again a bit farther down, he appeared to be holding to the overturned boat and working it toward an eddy along the right bank. Lint and I pulled across to him, but he had the canoe against the rocks and was trying to right it before we arrived. It was a hard place to work in on account of the packed driftwood, but a few minutes sufficed to have the *Mojave* in commission again and pushing on down with the rod. To Dodge, who was born in Hawaii and half raised in the water, the upset was no more of an incident than his morning bath. Indeed, the risk to a man wearing a life preserver of worse than a wetting and rolling after being thrown out in any but a rapid badly beset with rocks has been

greatly overrated. Any experienced riverman not trying to capitalize his experience will admit the fact freely, and it is especially true of a river with water as warm as is that of the Colorado in midsummer.

We ran two more lively rapids before noon, the last below a canyon that appeared to be that of Tanner's Wash, which the Lee's Ferry-Flagstaff road follows through the Navajo Reservation. The worst rapid of the day was the last of the afternoon, several of the waves of which looked as big as any in that of Soap Creek. No boats carried passengers, these having a long, rough walk over the talus of the left-hand cliff to a beach a quarter of a mile below. Kolb slid into some of the roughest water at the outset and had a very animated passage. Most of the bottom of the *Marble* was visible when she hit the heaviest of the lower waves side-on. One of Kolb's oarlocks broke as he was pulling out, but he replaced it in time to avoid trouble under the overhanging cliff.

The other three boats ran through without incident. Drifting down past the undercut cliff, I noticed for the first time the water-polished limestones which had led Powell to apply the name of Marble Canyon to the gorge which is properly the upper end of the Grand Canyon. This is not a real marble, according to Moore, but it is very hard, takes a beautiful finish and would undoubtedly make a fine building stone. I passed within oar-length of some brilliant outcroppings of rock crystal, and at one point about forty feet above the water was the mouth of a cave of considerable depth.

We ran on to a camp at the head of a very abrupt and noisy rapid, where the seepage from a steep canyon formed a number of clear springs, while a rising series of hard sand terraces gave good sleeping room. Climbing over the rocks to look at the rapid we found a complete trapper's outfit half buried in the sand of the floor of a large cave. Traps, cooking utensils, brace and bits, saw, files, awls, coffee-mill and a number of other things were listed and laid out for a photograph. The only article of wearing apparel was a rubber boot. As the cave was below high-water mark, it appeared probable that all of the lighter objects had been carried away. We could only conjecture as to the fate of the trapper, or trappers. As there is no record of any such party reaching or passing Bright Angel, it seemed practically certain that they were lost, with their boat, in trying to run or line (probably the latter) the rapid below. Indeed, we had a graphic illustration of what may have happened to the trappers' boat while preparing to run what it had been decided to call "Cave Rapid" the following morning.

Burchard, Dodge and Kolb were just starting to line the canvas boat down the right side of the rapid to have it available below in case of emergency, when —due to the painter being slacked too quickly—the little craft carried over a rock, filled, and smashed into a shapeless mass all in a few seconds. An hour's work by the whole ten of us salvaged only one oarlock and a mass of kindling wood. We were quite unable to drag the canvas skin from where the current had wrapped it round a boulder. The little

boat had been very useful but far from indispensable; its early loss, moreover, had been anticipated. Dodge and the rod went to ride on the *Glen,* while the cook was shifted to the *Marble.*

All four boats ran Cave Rapid without passengers. The waves were rough, but after starting in down the middle of the V it was not hard to pull to the right into a big eddy choked with floating driftwood. Rapids were scarcely less frequent than the previous day, but through most of them it was possible to carry all hands. Running a sharp pitch just before lunch, I managed to avoid some of the biggest waves by hard pulling, but in working out of eddy setting strongly against the Cliff below I had to lean rather heavily upon my oars. Nothing gave way at the time, but a few minutes later my right oarlock broke off at the ring, where there proved to have been the flimsiest sort of a weld. Moore passed me a spare oar, with rowlock attached, almost instantly, so that I had no trouble in keeping clear of the cliff. As this was the third failure of the kind we had had within three days, it left us with no kindly feeling toward the Los Angeles Harbour firm which had furnished the oarlocks.

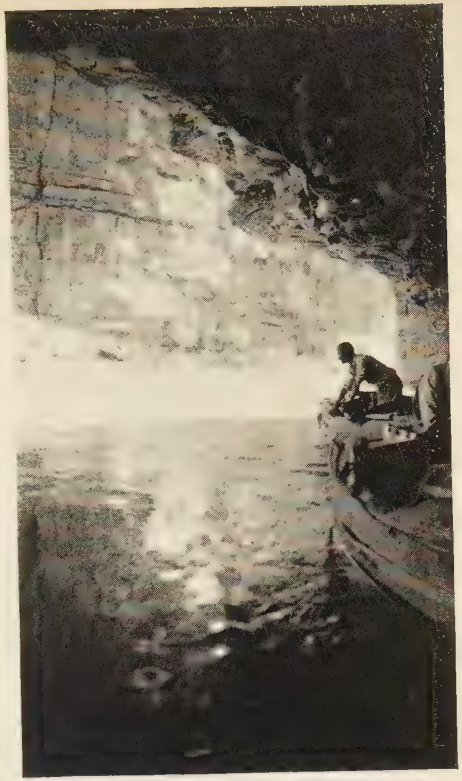
We had a pleasant camp that night on a beach between two winding rapids, with the seep from a canyon supplying good drinking water again. Burchard, after completing his surveying, stated that he was inclined to the belief that this camp was in the vicinity of Stanton's "Point Retreat," and that the canyon behind it was the one by which he had left the river after the culminating disaster had resulted

in the drowning of two more members of the Brown party of 1889. Distances and data are too conflicting and meagre to make possible a definite conclusion on this point.

Another day found the Redwall Limestone rising higher and higher above the inner gorge. Cave formations became more frequent, most of them apparently being due to the leaching action of water trickling down from above, though those along the water line have plainly been cut by the river. At times the lofty outer wall of the Kaibab was visible, yellow-dun against the cobalt sky, with the red-brown Supai below. The Hermit Shale had entirely disappeared from sight, but Moore said it was still in its place, hidden by a talus from the Kaibab.

Running several easy riffles, we came just before noon to one which disappeared around a bend and was divided by the first midstream boulder bar we had encountered. A brilliant patch of verdure against the side of an amphitheatre at the right of the bend recalled the leafy bowers of Glen Canyon. A hundred feet farther down the side another patch of green, shot with gushing jets of clear water, revealed the place as Vasey's Paradise—named by Powell after a botanist associate. The water was too swift round the outer curve of the bend for a landing, but from the boulder bar in the river an effective composition was offered for a moving picture of the boats running the riffle against a background of the sun-brilliant spouts of falling water.

The cliffs below Vasey's Paradise are unrivalled in the whole Grand Canyon series save possibly by



LOOKING OUT FROM A CAVE IN MARBLE CANYON

SURVEYING IN THE LOWER GRANITE GORGE

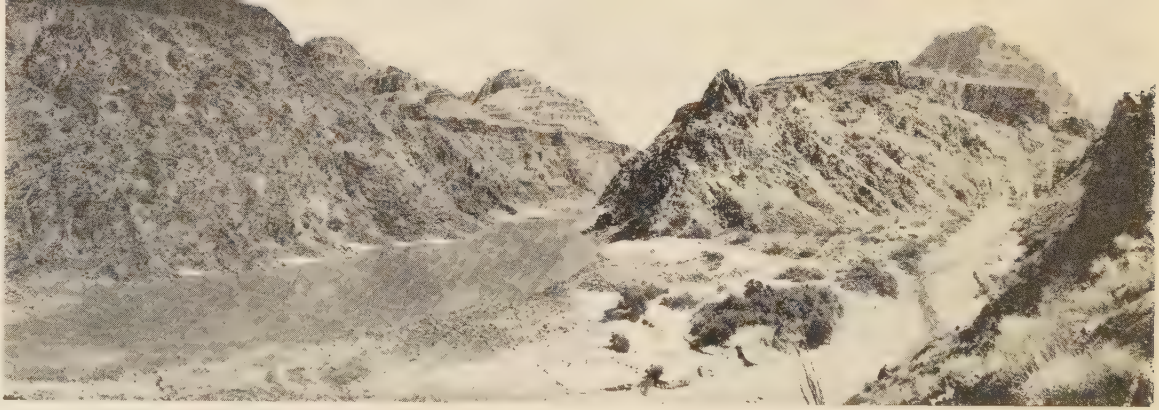


Photo by U. S. Geological Survey

UP-STREAM VIEW OF DIAMOND CREEK DAM-SITE

those in the vicinity of the mouth of Havasu Creek. Delicately rather than brilliantly coloured, their subdued pinks and yellows and browns threw back to the depths of the gorge a mellow blend of lilac, pearl and amethyst that had almost the palpable fluency of poured wine. Plummets of sunlight alchemised frequent wedges of swirling water to arrowheads of liquid gold, with saffron-bright motes weaving in a saraband on the wall above in the dusky purple shadows of a cave-mouth. Quiet smooth-flowing water gave us opportunity to revel in the veritable symphony of colours undisturbed by navigational worries.

We found cold springs spouting out of the rock at a number of points. Some of the most ambitious of these had built themselves little turreted houses from the mineral salts carried in solution—real miniature shower-baths, with the glint of falling water and the rattle of spray always in evidence as we drifted down past their mist-curtained windows. Grass and flowers were lush and green within spattering range of the flying drops, and it was no end of a delight to drop in from the scorching sunshine of mid-river, to lounge for a few minutes and perhaps strip for a hasty bath in clear water. When one wears only half a pair of pants, or thereabouts, taking a bath is not a matter of extended preparation.

Farther along this same stretch of canyon we came to a fantastic jumble of windows, gables, turrets and buttresses for which the name of "Goblins' Castle" would be highly appropriate. It had one small hole looking out to the sky through its cliffy roof, and during several hours about midday this must let a

beam of sunlight through to dance upon the waves of the riffle that is trying to undermine the limestone foundations of the crazy pile.

Toward the end of the afternoon we landed to explore a large under-cut cave or amphitheatre beneath the left-hand cliff. The roof rose steadily until it overhung the middle of the river at a height of two hundred feet. The floor was a succession of terraces of hard, smooth sand, rising like the seats of a stadium until the highest touched the vault of the limestone roof. Powell was in error in locating this cave above rather than below Vasey's Paradise. His estimate of a potential seating capacity of 50,000 was rather liberal. It might have a capacity half that of a modern football stadium, but a quarter or third would probably come nearer it.

On the 9th we passed the first mesquite trees and sighted the first deer. We tried to corner the latter on a talus for the benefit of the movie camera, but they were too shifty to make anything in the way of close-ups possible. A doe escaped by swimming the river, part of the distance through a fairly swift riffle. A huge boulder, planted squarely in the middle of a short but savage rapid, halted us early in the afternoon at a bend which was identified beyond a doubt as Stanton's "Point Hausbrough." As the obstruction ahead plainly needed careful study before passing, and as the 10th had been set aside for observance of the memory of the late President in any case, a two-day camp was made on the sandbar opposite the historic landmark.

A series of terrific wind squalls swept the river just after we landed, at the height of which water was blown far up the beach where we were starting to pitch camp. The cliffs were masked with clouds of blown sand and the foam above the wave thrown back from the great midstream boulder was carried high up against the leeward walls. Black, swollen thunderheads began gathering in the wake of the squalls and the main storm broke just as supper was over. There was a lively scramble to keep beds from blowing away and sparks from the camp-fire setting alight various scattered inflammables. After the wind the rain set in—first in violent squalls, then in a steady downpour. As no shelters had been set up, everyone did the best he could in the way of improvising for himself. Most swathed in pieces of canvas; some crawled into sleeping-bags and covered up; two or three crept into the emptied holds of the boats. Probably the best solution was hit upon by those of us who stacked their stuff under tarpaulins and cavorted about in the warm rain *au naturel.* Violent storms of this character continued to sweep our camps at frequent intervals until about the middle of September, when the cooler weather of early fall put an end to the seasonal disturbances of the summer.

Of the burial of Peter Hausbrough, drowned about ten miles above, Stanton wrote: "We stood around the grave while one short prayer was offered, and we left him with a shaft of pure marble for his headstone, seven hundred feet high, with his name

cut upon the base; and in honour of his memory we named a magnificent point opposite—Point Hausbrough."

Although the grave must have been immediately behind our camp, careful search failed to reveal it, doubtless because the talus at the foot of the cliff had been built up a number of feet in the third of a century which had elapsed since the inscription was carved. As there can be very little if any doubt as to the location of Stanton's Point Hausbrough, the tragic event which it commemorated deserves to be recognized by perpetuation in official nomenclature,

The rock-obstructed rapid below our camp was plainly of very recent formation. No mention of it is made in the records of any of the earlier voyageurs, and Kolb said he had no recollection of it from his passage of but little over a decade ago. There appeared to have been a straight, steep chute here in the first place, and this had been dammed by a great slide from the right-hand wall, Point Hausbrough. Immediately after the slide the obstruction must have extended from bank to bank, doubtless backing up the water for a considerable distance upstream. Then this broke and carried down the looser debris, leaving only the huge block of limestone planted squarely in the middle of a fierce tumble of broken water. Above the rock was a back-thrown wave of water over ten feet in height; below it a whirlpool with a depression half as deep as the comber was high. On account of the throw-off of the wave an actual collision with the rock itself was improbable, if not impossible; the danger was in an

upset which would allow the overturned boat and its boatman to be drawn into the whirlpool below, where an uncomfortably rough and protracted stay would hardly be avoidable.

After looking over the rapid carefully from every angle during our rest day, it was decided to run the right-hand channel. The down-rushing chute appeared to divide almost equally upon the great rock, but there seemed to be a shade greater concentration of current on the side toward Point Hausbrough. We pulled all four boats up the eddy, crossed over and tied up on the right bank two hundred yards above the head of the rapid. Kolb ran bow-first, getting as much way on as possible, shooting down the right side of the V and continuing to pull away from the back-curling wave thrown off by the rock. His boat had a hard slap, as did the *Boulder* which followed, but neither was near to serious trouble.

Blake, running next, evidently failed to get far enough to the right. The *Glen* was driven down against the back-thrown wave side-on, and missed capsizing by a hair. Looking back from above the rapid where I was about to push off with the *Grand*, I saw all of the bottom-boards of the boat as it was flung on its side; then the flick of a flying oar and the sprawling body of a man silhouetted against the cliff below as it hurtled through the air. An instant later all had disappeared, and I had to run through myself to learn what had happened. I eased pulling a bit sooner than was desirable after dropping over the brink of the chute, and so came in for a harder slap from the wave than there was occasion

for. The blow was scarcely less solid than that from actually striking a rock, and the geyser of tumbling water inflicting it looked even less friendly rearing up above my head than when seen from the bank. My heavily loaded boat righted quickly, however, and shipped very little water. As it shot past the rock I caught a transient glimpse of the hole below out of the tail of my eye. That was another little corner that did not improve with closer acquaintance, especially with the whirlpool showing off what it could do by bumping a captive log of driftwood up against the rock. The cat-and-mouse game looked as though it might have been going on a long time. The maelstrom was whoufing with glee and looked good for keeping its end of the sport indefinitely; and until it relaxed its hold the only chance the log appeared to have of escaping was through being battered to bits against the boulder. I was glad to pass the outer tips of the indrawing tentacles of the octopus by a comfortable oar's-length.

I found the *Glen* right-side-up in an eddy, with its boatman just finishing bailing the cockpit. He confirmed the impression I had received from above, that the force of the blow on the side of the boat had flung him over the gunwale without touching it. Quite unhurt, he had climbed back aboard after the *Glen* had cleared the whirlpool, replaced a lost oar and pulled into the first quiet water.

Three days more boating took us to and past the mouth of the Little Colorado. There was almost continuously swift water much of the way, but con-

siderable rapids only below the bars of the Nancoweap and Kwagunt. The latter had some really rough waves, apparently much worse than any of those preceding us had encountered. Doubtless an accession of boulders brought down the Kwagunt on the crest of a cloudburst wave accounts for the change. The Little Colorado showed signs of having been in flood, and was still flowing an unseasonably high stream of vile-smelling mud. The main stream was never quite as pleasant for bathing after receiving this sewer-like discharge, the rank, offensive smell of which we were destined to experience on one or two later occasions.

The survey showed the length of Marble Canyon to be slightly over sixty miles, and the elevation of the mouth of the Little Colorado as 2725 feet. Dellenbaugh had estimated Marble Canyon to be sixty-five miles long. The discrepancy is not great considering the conditions under which the Powell expeditions made their calculations.

There proved to be nothing at the mouth of the Little Colorado resembling even remotely the great whirlpool located there by James White in his lurid account of a raft voyage through the Grand Canyon in 1867, two years ahead of Powell. Indeed, from first to last the observations of the survey were calculated to discredit every statement of a sensational yarn which, even as late as 1917, was considered worth recording in a special Senatorial document. As I have already written at some length in an endeavour to give a fair consideration of White's

wholly impossible claims,[1] I mention the matter here merely to record that the intimate knowledge of the Grand Canyon gained in the course of our recent voyage makes the averred adventure of the Colorado prospector appear more utterly absurd than ever.

[1] See *The Colorado River: Yesterday, To-day and To-morrow*, Chapter VIII.

CHAPTER III

HELL AND HIGH WATER

Four miles above the mouth of the Little Colorado we entered the Grand Canyon National Park. As the several sheets covering the course of the Colorado through the National Park are rated as perhaps the finest examples of topographical mapping in existence,[1] the work of the river party was greatly simplified for most of the next hundred miles. There was no longer need to survey side canyons, while the amount of topographical work on the main river was materially reduced. This left the carrying of the river line as the principal work of the topographic engineers of the expedition, materially accelerating our rate of progress. Where three or four miles was a good average day's work in Marble Canyon, from five to ten could be covered through the National Park where especially bad rapids did not cause navigational delays. We were usually three or four days ahead of schedule all the way from the Little Colorado to the mouth of Havasu Creek.

There is swift water and a heavy fall to the river all the way from the mouth of the Little Colorado

1 The Vishnu, Bright Angel and Shinumo sheets of the Geological Survey represent many years of work by Topographic Engineers François Matthes and Richard T. Evans. They are considered equal, if not superior, to the finest work of Italian, French and Italian topographers in mapping the Alps.

to the head of the Granite Gorge but only three or four major rapids. The last of these is the Hance, at the foot of the trail of that name. We had lively boating in a storm-swollen river all the way down this twenty-mile stretch, but no serious mishap. Birdseye was knocked off the stern of the *Boulder* while trying to land through a wiggly swirl, and Moore, intent on geology rather than the river for a moment, narrowly missed being flung from the bow of the *Grand* into a good rough little riffle. A long crescent-shaped rapid, falling twenty-one feet as it banged down against an under-cut cliff, had a threatening look, and we looked it over with some apprehension because of the fact that the Kolbs and other voyageurs had been in difficulty there. Luck was with us, however. Although we put into the head on the crest of a rising flood and into the teeth of a violent sandstorm, partly filled cockpits were the worst of our troubles.

We reached the foot of the old and long disused Hance Trail in the forenoon of the 16th, four days ahead of the time our pack-train had been ordered to come down with fresh supplies. The interval was taken advantage of to send out to El Tovar and have new and stronger oarlocks made in anticipation of rough work in the Granite Gorge below. Hance Rapid, with twenty-eight feet of fall in its upper section, was in some respects the worst-looking place we had yet encountered. There were many rocks peppered about below the head, with most of the current setting into a villainous nest of boulders and a deep hole near the foot. From here continuously

broken water ran on into the second section of the rapid, which in turn wound down and disappeared into the black cliffs at the head of the Granite Gorge. Trouble in the mess of rocks in the upper fall held the unpleasant possibility of a continued excursion on into the sinister depths of the sheer-walled chasm below, where landings of any character were few and far between.

As far as our records showed, no previous party had run all of its boats through the Hance Rapid. The portage being a long one, and conditions for lining down the side almost impossible at the present stage, running seemed worth chancing, especially as we had the mules of the pack-train available to carry our loads down. The decision proved well justified. The emptying of the holds of the boats made an unbelievable difference, not only in their responsiveness to the oars but also in their ability to ride over waves which would otherwise have buried them. It gave one rather a better feeling, too, to know that there would be a thousand pounds less behind the impact in case of striking a rock, and that in the event of a smash-up there was nothing much of anything to be lost but the oars. It was a fine sporting run. None of the boats was near to trouble save the *Marble*, which teetered giddily along the brink of the deep hole at the right and failed to make the landing at the end of the portage on the left. Lint, who was riding through with Kolb to help in case of an upset, reported that the depression was so deep that he could barely make out the bottom as the stern of the *Marble* overhung it in shooting by. Kolb, whose

difficulties were possibly due to the fact that he was using nine-foot oars for the first time, brought his boat to the bank two hundred yards below, near the head of the second section of the rapid, from where we lined it back to the beach upon which our lower Hance camp was pitched.

After a day spent in going over our boats, we pushed off again on the morning of August 21. The lower riffle of Hance Rapid, in which one of the Kolbs had upset in 1911, gave us no more than a good splashing. A light drizzle of rain was falling as we entered Granite Gorge, but even with that the walls had a less sinister aspect than one expected after Powell's description. An impression of that kind is largely psychological, no doubt. Powell, with dwindling, half-spoiled supplies and battered boats, was facing both starvation and the Unknown; we, with a fully equipped outfit, were pushing on for the foot of the Bright Angel Trail with the prospect of a three-day rest at El Tovar Hotel on the rim. No wonder we had eyes for the gleaming brightness of quartz, feldspar and mica where the pioneer explorer saw only the forbidding loom of dark walls of igneous rock.

A mile in heavy swirling water took us to the head of the Sockdologer Rapid. Landing two hundred yards above the first drop, we climbed down along the right-hand wall to the nearest point attainable to the brink of the opening drop. Powell's and Dellenbaugh's estimates of a fall of from eighty to one hundred feet in a third of a mile, with waves thirty feet high and spray dashing double that height, pre-

pared us for something on a big scale, though we knew in advance that these figures were rather liberal. The fact that this was the first major rapid where the impossibility of climbing round made it necessary to carry the whole party on the boats, lent an added interest to the Sockdologer.

The famous rapid was not entirely a disappointment, for the initial fall proved extremely abrupt and the waves below this very high. But it was all deep water in mid-channel, with the combers by no means so sharp and broken as when under-laid by boulders. There was plainly no such menace in the rapid as in the Hance and several others already run where the fall was over rocky obstructions. As there was no chance to land to set up rods or instruments for nearly a quarter of a mile, some difficulty was experienced in running the survey line, but this was finally accomplished.

Blake and Kolb ran through with one passenger each; Lint and I with two. The height of the waves was much greater than any we had previously seen, but their evener run gave the boat just enough time to lift over them without burying herself as in the broken water of boulder rapids. La Rue was not much splashed on the stern of the *Grand;* Moore, on the bow, was bone-dry. Not more than the usual amount of water came over the side to drench me and the cockpit. There were only three or four inches covering the bottom boards when I pulled into an eddy under the lefthand wall at the foot of the rapid. All in all, the run through the Sockdologer was the best sport from a boatman's standpoint of any of the

voyage—partly because of the great height of the waves and partly because we knew there were no rocks under them to bother about.

Burchard, pulling in with the instrument for lunch, announced the fall of the Sockdologer as nineteen feet; less than a quarter of Powell's original estimate and a little more than half of that of the conservative Julius Stone. My own rather vague impression of the height of the waves was as being from ten to twelve feet; some of the engineers, with a better chance for studying them and trained eyes for estimating, were inclined to think the largest combers were higher from trough to crest than the lengths of the boats—perhaps twenty feet.

The Grapevine Rapid, a few miles below the Sockdologer, proved of much the same character as the latter and gave us the same exhilarating runs. Powell had a good deal of trouble in passing this rapid on both his first and second expeditions, probably due to the fact that he attempted some very difficult and dangerous lining in preference to chancing a run down the middle. The fall was given as sixteen feet. The remainder of the run to the mouth of Bright Angel Creek proved lively but not difficult boating.

Hydraulic Engineer Dudley of the United States Geological Survey Gauging Station stated the river had a flow of 25,000 second-feet on the day of our arrival: 3000 second-feet more than that of the day of our departure from Lee's Ferry. A few days previously it had been as high as 34,000 second-feet,

probably the most considerable volume any party has experienced in the Upper Granite Gorge. As far as we could judge, however, the unseasonably high water, contrary to expectations, had been a help rather than a hindrance to navigation.

. . . . . .

After three days at El Tovar the voyage was resumed from the Suspension Bridge on August 27th. Hermann Stabler, Chief of the Land Classification Branch of the Geological Survey, joined the party at the foot of Bright Angel Trail the following day, remaining with it to the end of the voyage. Personally and technically he was a valuable addition to the expedition.

The seventy miles of canyon between Bright Angel Creek and Havasu Creek—the lower boundary of the National Park—were marked by frequent major rapids, many of them of considerable violence. In spite of the fact that most of the previous navigators had met with serious disasters at various points in this rugged stretch of gorge, our good luck held and our mishaps were largely of a minor character. Kolb had the cleat of an oarlock torn out in running Horn Creek Rapid, and Blake's boat had a severe bumping after being carried into a whirlpool at the side of the same savage tumble of water. Monument Creek Rapid, with nineteen feet fall, and Hermit Creek, with sixteen, gave us fine slap-banging runs but nothing worse than good soakings. Hermit Creek, the one major rapid in the Grand Canyon readily accessible by trail from the

rim, was run in the presence of a large and distinguished gallery from El Tovar, rather a novel experience for both parties.

A heavy rapid below Serpentine Creek—probably the one which Stanton had characterized as "the worst and most unmanageable on the river, and where his *Marie* was smashed beyond all hope of repairing —furnished a bumpy run but no trouble. Walthenberg Creek Rapid, where both of the Kolbs upset with serious damage to one of their boats, gave us some hard work in pulling in sharply enough below to pick up our passengers. Although its thirteen feet of fall in a very short distance makes Walthenberg one of the steepest rapids on the river, it was not especially bad to run at the stage of water we found there.

Running out of the granite, we found the gorge more open in the Tapeets, but by no means without rapids which required careful navigating. Not far above Tapeets Creek my poor judgment in running almost into the middle of a viciously tumbling rapid brought the stern of the *Grand* into solid and violent collision with a very firmly planted boulder. That the boat did not telescope is an excellent testimonial to the strength of its construction. I had the impression that it actually bounced back upstream from the violence of the impact, but it probably no more than stopped dead in the bottom of the hole where the boulder lurked, while water surged over from all sides. As it had no load in the holds at the moment the *Grand* rose buoyantly with a half-filled cockpit, and I had no trouble in bringing it in to

GEOLOGIZING UNDER DEER CREEK FALL

MEASURING THE FLOW OF DEER CREEK

beach at the foot of the rapid. An incipient leak from a crushed-in quarter was effectually closed with a patch of canvas and white lead. A lusty wallop on the nose by the handle of a back-kicking oar at the instant of impact was the only violence I suffered personally as a penalty for a collision which should not have been allowed to happen. This mishap appears to have occurred in the same rapid in which Deubendorff, of the Stone party, was upset and roughly rolled in 1908.

The distinction of the first upset fell to Kolb while trying to run a rough and hitherto-unnamed rapid a few miles above Havasu Creek. It occurred as a consequence of allowing his boat to draw into a deep hole under a large boulder, where it capsized, cupping him under the cockpit. He bobbed up a hundred feet farther down and climbed out on the bottom of the overturned boat. With the assistance of Dodge, who jumped in and swam out to the derelict, it was brought to the bank three hundred yards below the foot of the portage, and subsequently lined back. Neither boat nor boatman was injured. The event was commemorated in the name of the rapid—"Upset."

At the mouth of Havasu Creek twenty Havasupai Indians, under the direction of Roger Birdseye, brought down eight hundred pounds of provisions for the long stage to Diamond Creek. Here the cook who had started with the party from Lee's Ferry, and who had asked to be relieved some weeks previously, was replaced by a genial Pole called Felix Homs, who completed the voyage with us. The un-

failing good nature of the new chef under conditions which must have been very trying to a fat roly-poly dumpling of man weighing 225, won him the affection of every one in the party from the outset. The radio set was sent out from Havasu for repairs, to be brought back to us at Diamond Creek, seventy miles below.

Pushing off from Havasu with deeply loaded boats on the morning of the 15th of September, three and a half days in a river with the lightest average descent yet encountered brought us to the head of the rapid called Lava Falls. The skies had been clear most of the way, but violent wind squalls indicated that equinoctial storms were gathering to break up on the plateau region behind us. If the radio set had been with us we would have received numerous messages broadcast from several stations in response to wires from Washington advising us that one of the heaviest storms of recent years had broken upon the basin of the Little Colorado, and warning us to be on the lookout for the waters of a very heavy flood. Having received such warnings, we should unquestionably have picked out a broad open section, with ample room to back away from a rise, and waited for the flood to pass. Unwarned, we were surprised at a time and place that were far from favourable—twilight on the brink of Lava Falls.

As the boulder barrier at the head of the rapid offered no runable channel at the stage at which we found it, the boats were lined down the right side of the most violent section to a narrow crescent of beach

below. Beds and cooking outfit were left at the head of the falls, where a few patches of sand among the boulders offered the only feasible camp-site. The rest of the outfit was carried down to the boats and restowed in preparation for an early start on the morrow. The portage was completed an hour before dark.

Immediately after supper it was noticed that the boats were awash at their moorings, and a few minutes later the beach upon which they had rested was completely submerged by the rising river. As there was no place but the sharply sloping hot-springs formations on which to pull them up, they soon began banging heavily as the waves from the rapid increased in weight. The *Grand* was in the worst position, being immediately under a ten-feet-high wall of travertine, with boulders all about. The other boats, for a while, could be drawn up a foot or two at a time as the water rose.

I buffered the *Grand* off the rocks with driftwood until the water was midthigh deep, and then crowded her in to take her chance with the other boats. Meanwhile it had become evident that a better mooring place would have to be found at once, as there was room for not more than one boat upon the shelf to which the water had now risen, and only an empty one could be handled even there. This would have to be the cook-boat, *Marble,* as all of the other three were heavily loaded.

It was now quite dark; all chance of seeking a safer mooring by daylight had been lost. The rest was a night job. Lint and Kolb pushed off in the

Boulder, the latter carrying an acetylene lantern and the former pulling cautiously down the eddy beside the lower end of the rapid. The rest of us were kept busy pulling in the three remaining boats and preventing their destruction from banging against the rocks in the waves from the rising and broadening rapid. Lint and Kolb returned in half an hour to report that they had left the *Boulder* on a sloping beach of limestone a third of a mile below, and to recommend that the *Grand* and *Glen* be taken down there at once.

Kolb rode with me on the bow of the *Grand;* Lint with Blake on the *Glen.* The moon was shining on the opposite wall and a part of the rapid. The latter had lengthened greatly and was booming louder every minute. The illuminated strip of rollers was a ghostly grey, and the effect curiously like that of wind-billowed canvas. We ran as close as we dared to the left bank of travertine, over which streams from the hot springs were falling, gleaming white in the reflected moonlight. There was not much current in the eddy, but a heavy lop from the main chute of the rapid splashed against, and occasionally into, the boat. A distinctly unpleasant odour to the water suggested that the flood was coming from the Little Colorado, the founts of which we had already discovered were olfactorily offensive. Mingled with this was a humid, almost tropical smell—rank vegetation and a suggestion of the perfume of flowers.

It was a weird and eerily stirring rather than a wildly exciting ride. Once or twice we were caught by the powerful downrush of the rapid, but a stroke

or two brought the boat back to the half-water on the verge of the eddy. As we doubled cautiously round a jutting point a new roar from down-river cut into the heavier boom of Lava Falls. Evidently we were nearing a second rapid not far below where the gleam of the tail of the first was quenched in the shadow of a moon-blotting cliff. Then a cove opened up to our left and I pulled into quieter water and beached the *Grand* beside the *Boulder* on a sloping shelf of travertine.

As there had been no chance to get my bed in the rush of pushing off, I took a lantern and started back to camp as soon as the boats were secured. It was vile work pushing across the slushy, crumbling springs formation, with a tangle of rotting vegetation underfoot, and huge thistle and saw-edged grasses that grew higher than my head. These prickers and cutters were particularly unpleasant as a consequence of the fact that my sole protection against them was half a pair of knickers and one tennis shoe. After fording three or four warm streams, I finally broke through to clearer going, but even here there were a half dozen breeds of cacti to complicate my nocturnal navigation. The last hundred yards was along the cliff and over boulders among which the rising flood was already beginning to swirl. There was zest and exhilaration in the blind ride in the half-moonlight down the edge of the booming rapid; the tortuous tramp back through the swamp of the hot springs was sodden grief all the way.

In my absence the *Marble* had been dragged several feet above the water, but the spray was already

beginning to dash over her again as the mounting waves banged higher and higher against the wall. I found everyone in camp engaged in moving back from the encroaching flood. We had hardly turned in before it was necessary to scramble back over the boulders and give the *Marble* another hoist. Then we had a rest until an ambitious wave came up and surrounded the bed of Felix, the cook. The surprised sleeper awoke in such consternation that he fled forthwith, leaving bed and clothes behind in the water. Birdseye and Dodge salvaged the sleeping-bag, and Felix was put to bed again on a higher level.

By morning the water was up to our feet, where we had rolled in after our final move to the last bit of beach under the mesquite. The rapid had altered in character overnight beyond belief. The head of the dam of boulders, where the previous day there had been a series of abrupt falls, was now completely submerged—drowned out. Over it rushed a broad, solid chute of wildly running water which did not begin to break into waves until half way down what had formerly been the rapid. From there on the combers were tremendous; quite the largest we had seen. These culminated in an enormous uptossed mass of churning, surging water just above where the boats were moored: a point at which yesterday there was only a swift but comparatively smooth stretch of current. This wave was a great boil or fountain, which at times measured all of from fifteen to twenty feet from trough to crest. It appeared to be caused by conflicting currents rather than by a

rock, and rarely assumed the same form twice in succession. At times, in breaking back, it cupped down a large quantity of air, which, when compressed, threw out jets of spume like that from a cavernous blow-hole on the ocean shore.

A continuous procession of drift logs of great size was moving down the river, some of the largest trees being upended and sucked down in whirlpools or, again, almost tossed out of the water. It looked barely possible that a boat might survive an attempt to run through the rapid, but only in the event it could be kept away from several of the largest waves. Probably the most favourable stage at which to run would be an intermediate one, somewhere between the low water we found on the first day and the flood of the second.

The river had risen fourteen feet during the night, to which eight feet more was added by evening of the second day. The hydraulic engineers of the party estimated the flow at from 75,000 to 100,000 second-feet. We learned subsequently that it had been over 125,000—considerably greater than that of the spring rise. The *Marble* had finally to be hoisted up an almost sheer wall by block-and-tackle to keep it clear of the climbing waves. The other boats, after unloading, were more easily handled.

After a three-days' halt to allow the flood to recede, we pushed off again on the morning of September 22nd. The increased weight of the water was evident the moment we were well into the current, and when it began to slop aboard in running the riffle under the cliff below it proved to be a ver-

itable liquid mud. A splash of it left a white coating on the skin as it dried, while the effect on the eyes was almost blinding. There was the same heaviness to the swirling water noted after previous rises, only much worse, so that the boats were more unmanageable. The run of water from riffle to riffle was almost continuous, and it was not always easy to pull into an eddy for a landing.

Many hitherto unmapped side canyons and a formation almost continuously broken and faulted retarded surveying greatly after leaving Lava Falls, and even by running two instruments we were not able to make up for the time lost in waiting for the high water to go down. Even with most favourable boating conditions, we were four days behind schedule in arriving at the mouth of Diamond Creek. This, and the reported sighting of an overturned boat marked U. S. G. S. below the canyon, was responsible for the highly sensational dispatches sent out by an Arizona press correspondent on the wholly unwarranted assumption that the expedition had met with disaster. Only the prompt and decisive action of "Land Manager" Roger Birdseye in showing the utter baselessness of this story prevented the sending of so-called relief expeditions which could have been of no possible use, and might ultimately have needed considerable relief themselves.

Navigation became more arduous below Diamond Creek. Three days of rough boating in a river with an average fall of over fifteen feet to the mile brought us to the head of historic Separation Rapid. The place, with its large canyons coming in opposite

each other, was unmistakable from the description of Powell and Stanton. Here, according to Powell's story, three members of his 1869 party, believing the river expedition was doomed to disaster, deserted and climbed out to the plateau by the canyon from the north. After seeking in vain for a practicable portage along the sheer cliffs, Powell put into the rapid with two of his boats and went through without trouble. The three men who left were killed a few days later by the Indians, though their fate was not learned for many months.

The charge has been made—based principally on statements made later by Sumner of the first Powell expedition, that the explorer did not give a true version of what really occurred—that the men were forced to leave against their will as the culmination of weeks of wrangling and hard feeling. There is much to support Sumner's version, and Stanton, among others, was convinced by it. The question is far too ramified for discussion here. Since all first-hand witnesses are dead, the truth can never be known. As no attempts were made to discredit Powell's story while he was living, posterity will doubtless be inclined to accept his as the most credible version of an unfortunate and tragic incident.

We had no more success than our predecessors in finding a way by which those not needed in the boats could climb round the rapid. Even Dodge, the rodman, who was all but fly-footed when it came to cliff-work, gave up after a persistent attempt to get by. The left wall proved to be sheer, though only about five hundred feet in height, rather than the thousand

estimated by Stanton. The right wall was more broken and not as high as the other, but still offered no chance to climb around more than the first riffle. It is probable that Powell, at a lower stage of water, had found it practicable to portage his boats along the upper section of this wall.

The *Glen* ran first and had a heavy tossing in the big waves where the second riffle began against the left-hand cliff. Solid water appeared to roll right over the head of Dodge, who was holding on to the stern. The heavy set of current against the jutting right-hand cliff was evidently hard to pull against, but Blake kept clear by a comfortable margin. The third riffle, with a broad shallowly submerged rock in the middle, offered no difficulties.

As I went back to the head of the rapid to take pictures of the two canyons and other features described by Powell, the *Glen* was the only boat I saw run. Kolb went through next, and then Lint. On being told that Kolb had carried dangerously near to the right-hand cliff, I decided to take a chance at putting into the heavy water at the head of the second riffle. This, I figured, would leave me on easy street in the matter of avoiding the obstruction on the right.

The head of the second or main riffle of Separation Rapid is the place of which Stanton wrote: "As I looked down into that pit of fury, I wondered if it were possible for our boats to go through it and come out whole, and right side up." A few seconds after that impression was registered, Stanton was in the water and his overturned boat had a hole in it.

Somehow the rapid had not looked as bad as that to me, which was rather unfortunate. Had I been a shade less confident of the ability of the *Grand* to ride any waves not fanged by rocks, it would have been easy to pull to the right of the heavily running combers at the head and fight it out with the current setting against the right-hand cliff, as the others had done. Instead, I tried only to keep the stern well on to the main line of waves on my left, and so allowed the boat to be caught quartering by a sneaking lump of comber lying in ambush on the other side. An easy, effortless uplift, the flip of a foam-flecked crest at just the right instant, and the thing was done. The supposedly uncapsizable *Grand* was bottom-up.

My only mental picture of the incident has to do with La Rue's thin legs spidering against the sky as he spilled off the stern hatch, all but falling into the cockpit. Then darkness and much rolling and tumbling of water. To keep from being cupped under the cockpit as Kolb had been in his upset above Havasu, I let go my oars and tried to dive. In this I was materially assisted by the swirls, for when I started back to the surface it seemed to have become misplaced. I could not locate it in any event. The several succeeding seconds were as active as unpleasant. I pawed water and gulped water but didn't seem quite able to bring the surface down where I could use it. Finally a violent swirl carried me to the top, but only to suck back my protesting anatomy so quickly that the breath of air I tried to get ended in a bite of water. This time the sub-

mergence was brief, and as my head came up again I managed to gulp a lungful of mixed air and spray.

The downward pull was still strong though intermittent, and my head continued to duck under now and then as I lunged off after the boat, drifting ten or fifteen feet downstream of me. I had the feeling that my saturated kapok jacket was giving very little support, but this may have been due to the drag of the current on my very heavy hob-nailed shoes. Moore, minus cap and glasses, was riding contentedly by one of the side ropes; La Rue was not in sight. The phenomenon of the right-hand cliff seeming about to topple over on us as the boat was carried under it was a bit disturbing, as one could have no illusions as to which would get the worst of it in case of a collision. The disappearance of the ominously looming wall and a throaty croak from the other side of the boat announcing La Rue was still a passenger, disposed of the salient worries of the moment.

A splash and a quickening of motion signalled the entrance to the third riffle. From above, squarely in the middle of this, the current had appeared to break in a broad low wave over what must have been a large flat rock, fairly well submerged at the present stage. It hardly looked capable of precipitating a violent smash at the worst, yet I was glad to see our derelict was giving it a wide berth to the left. The boat danced at a merry pace on through the rest of the riffle, but not in a way to make it at all hard to hold on.

Moore and I climbed up on the bottom of the boat as soon as it floated into quieter water, but as La Rue appeared somewhat dazed it was not practicable to attempt to right her in midstream. This was accomplished as soon as Blake and Dodge, on the *Glen,* had worked her in to an eddy against the left wall. Bailing hastily, I replaced a lost oar and pulled across to a beach on the opposite side to dry out. The little water that had entered the holds had done no harm, even to an unprotected sack of sugar. The only losses of moment were Moore's coloured glasses and several irreplaceable geological specimens, loose in the cockpit at the moment of upset. My missing oar was picked up a few miles below, and restored to the mate with which it had worked all the way from Lee's Ferry.

Lava Cliff, the rapid considered by Stone as the worst in the whole Colorado canyon series, was passed by an intricate and laborious piece of lining on October 11th and 12th. As far as the records show, Powell's first party was the only one ever to attempt to run this savage tumble of waters, and that was done in an effort to save a boat that had to be cut loose while lining. Bradley took the castaway through with only a steering oar, and the other boat, though overloaded, also survived the passage. Possibly the cloudbursts of the intervening half century have piled up boulders to render the obstruction more formidable, for it would seem that an undermanned or an overloaded boat would have short shrift there to-day. In any event, none of the parties

following that of the pioneer have seen fit to take the chance.

Burchard, the topographic engineer who was handling the instrument in running the river-line, was the victim of two bad falls the day we left Diamond Creek. In the first, when he was precipitated upon a barrel cactus with fishhook spines, he was saved from injury through the fortunate circumstance of having used the leg of a discarded boot to patch the seat of his trousers. In the second fall he landed upon the corner of his instrument box and fractured a rib. Although in much pain at times, he stuck gamely to his work, and on October 13th was rewarded by picking up with his instrument a little pyramid of white stones on a jutting point ahead. It was the monument marking the highest point reached by his upriver survey of 1920. When the two surveys were tied-in, their elevations were found to check within four feet.

There were many splashy rapids remaining below us, but none which could not be run without a preliminary reconnaissance. With the survey completed progress accelerated at once. We ran out of the canyon on the first day, and by noon of the fourth day from the Grand Wash the boats were tied up at the bar at Needles. Over fifty miles a day had been averaged where the broad shallow river wound down through open valleys.

The party disbanded at Needles on October 20th, from Flagstaff. The *Glen, Boulder* and *Marble* just over three months from the date of departure

were returned to the Southern California Edison Company, by which they had been loaned to the Geological Survey; the *Grand* was shipped to Washington to be put on permanent exhibition at the Department of Interior.

THE END

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FREEMAN

Freeman, R. Lewis.
Down the grand
Canyon.

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